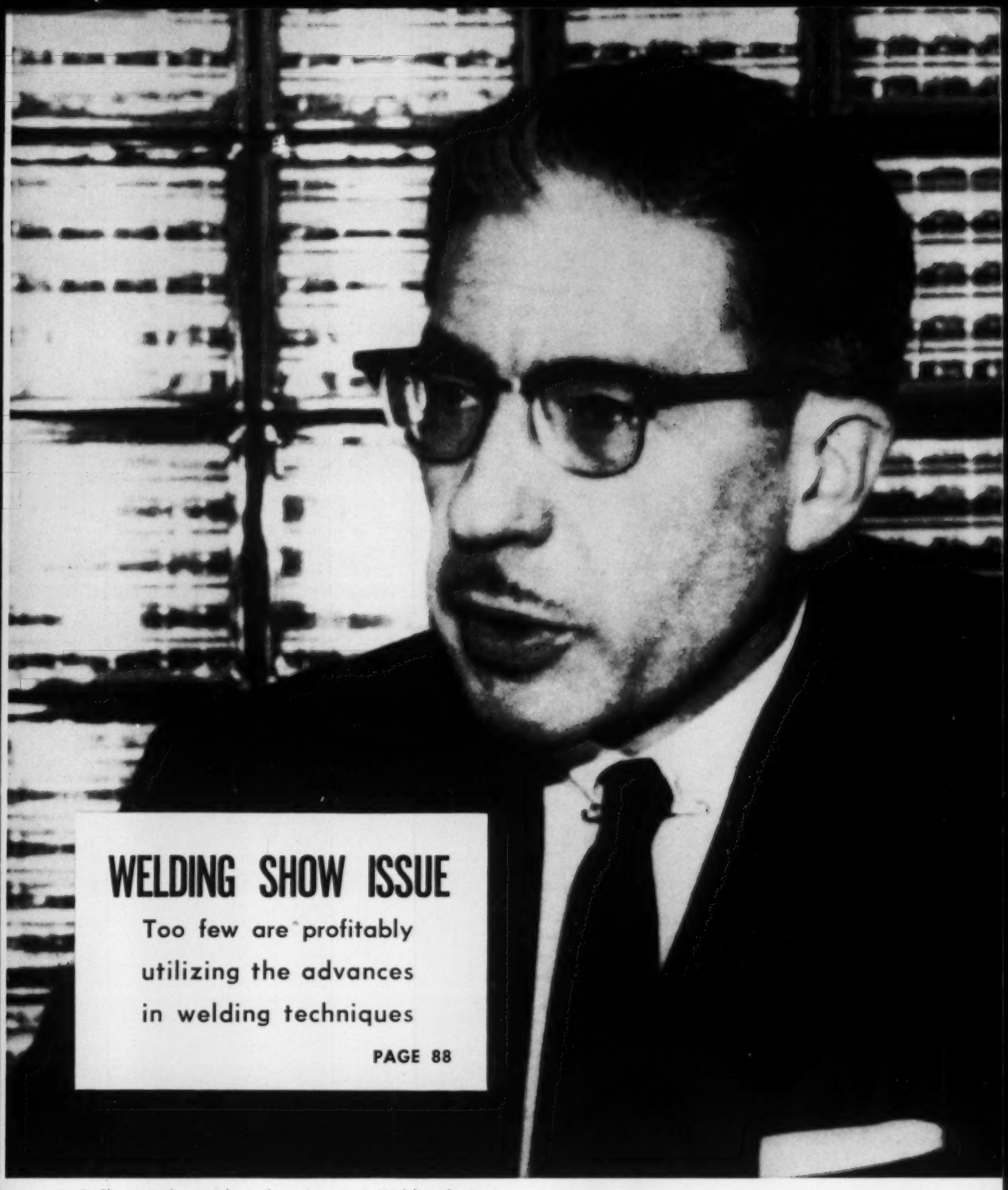
STEEL
The Metalworking Weekly
APRIL 10, 1961



WELDING SHOW ISSUE

Too few are profitably utilizing the advances in welding techniques

PAGE 88

A. F. Chouinard, president-elect, American Welding Society

Modern Farms: A Marketing Challenge 43

Great Lakes Shipping Gets Slow Start 49

Program for Management — Our $7 Billion Indirect Labor Waste . . . 53

Where Steel Went in 1960 126

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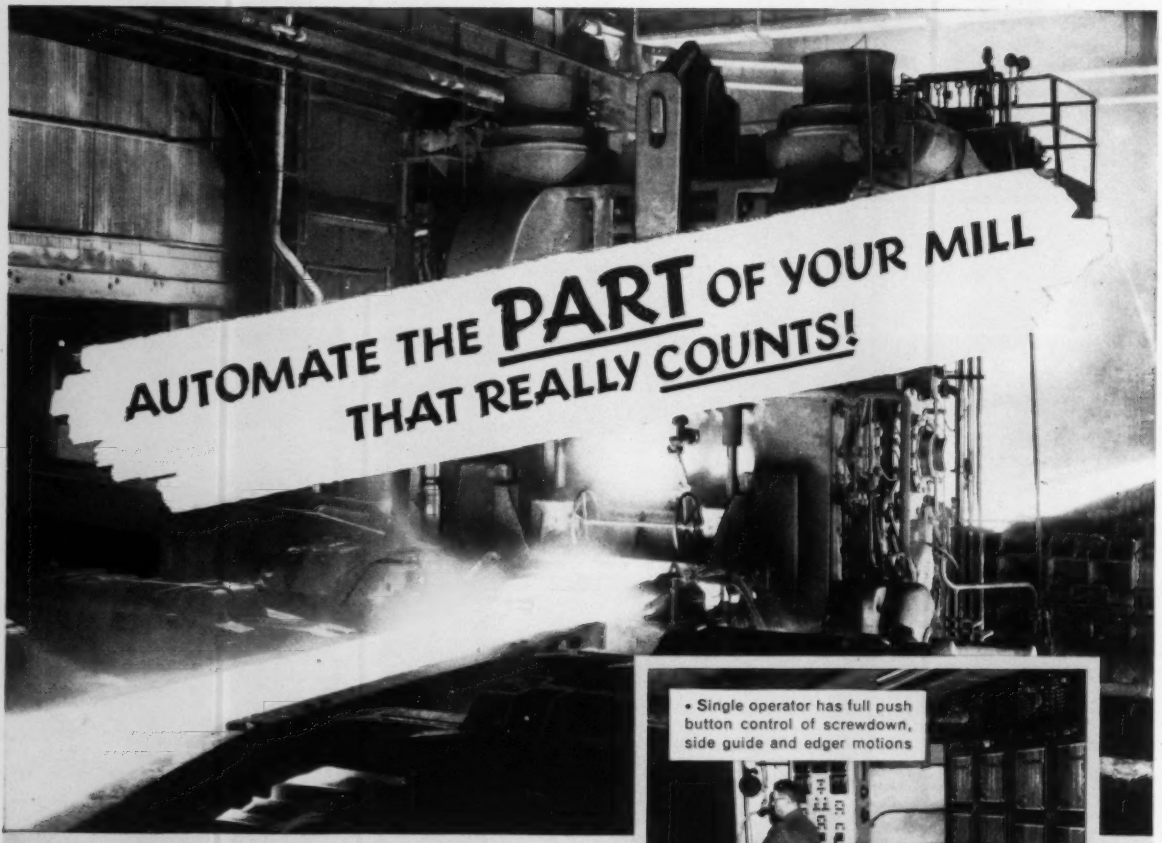

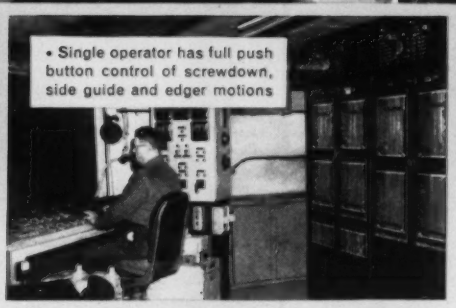

You can cut initial investment in HALF -- save on maintenance, too!

Is complete automation of your mill really necessary? EC&M has built automatic screwdown systems for dozens of existing mills, which are giving excellent results at low cost. We are continuing to supply systems which improve results with just one operator in the pulpit.

With the EC&M method, a single push button positions screwdown, side guides and edgers automatically for each pass. No need to memorize rolling schedules...no inaccurate roll settings... the roller's task is greatly simplified. Better quality of rolled product is assured with equal or better output at a low initial expenditure—less than half the cost of completely automating all mill movements. Moreover, the regular maintenance crew can do all servicing...no special personnel training or extra manpower needed.

EC&M Engineers will be glad to study your requirements and recommend the equipment required to give effective results, economically.

7 years of successful rolling at Granite City Steel
Since it was installed at Granite City Steel seven years ago, the EC&M automatic screwdown system shown above has maintained consistent high quality and output. A single roller operates all motions of this mill, and his efficiency stays at a peak throughout a turn. There is less operator fatigue, physical or mental. In seven years, there have been no production bottlenecks, no delays.

Write FOR DETAILS • Ask for Bulletin & Progress Report 6550. Square D Company, EC&M Division, 4500 Lee Road, Cleveland 28, Ohio

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EC&M DIVISION • CLEVELAND 28, OHIO
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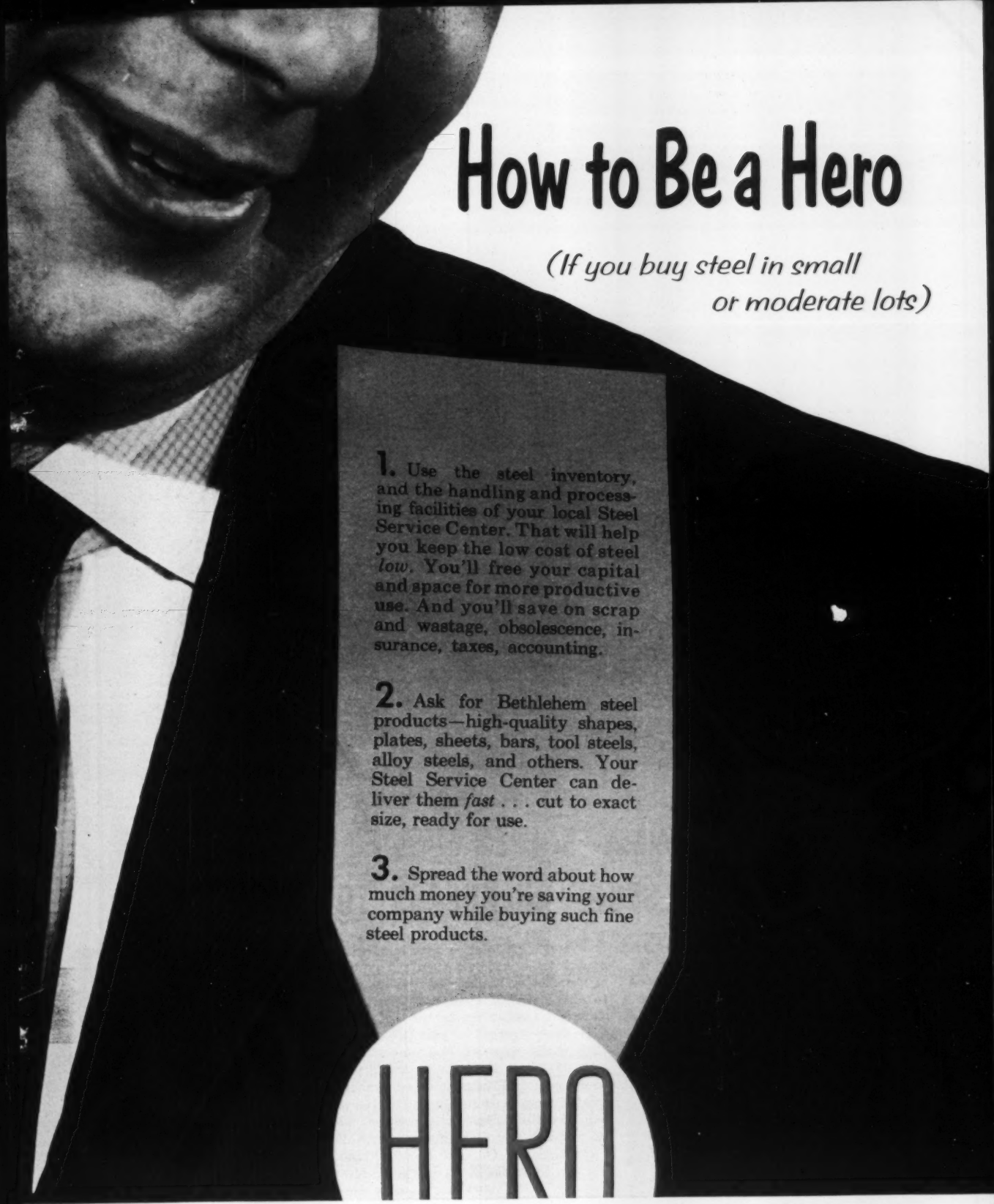


How to Be a Hero

(If you buy steel in small or moderate lots)

1. Use the steel inventory, and the handling and processing facilities of your local Steel Service Center. That will help you keep the low cost of steel *low*. You'll free your capital and space for more productive use. And you'll save on scrap and wastage, obsolescence, insurance, taxes, accounting.

2. Ask for Bethlehem steel products—high-quality shapes, plates, sheets, bars, tool steels, alloy steels, and others. Your Steel Service Center can deliver them *fast* . . . cut to exact size, ready for use.

3. Spread the word about how much money you're saving your company while buying such fine steel products.

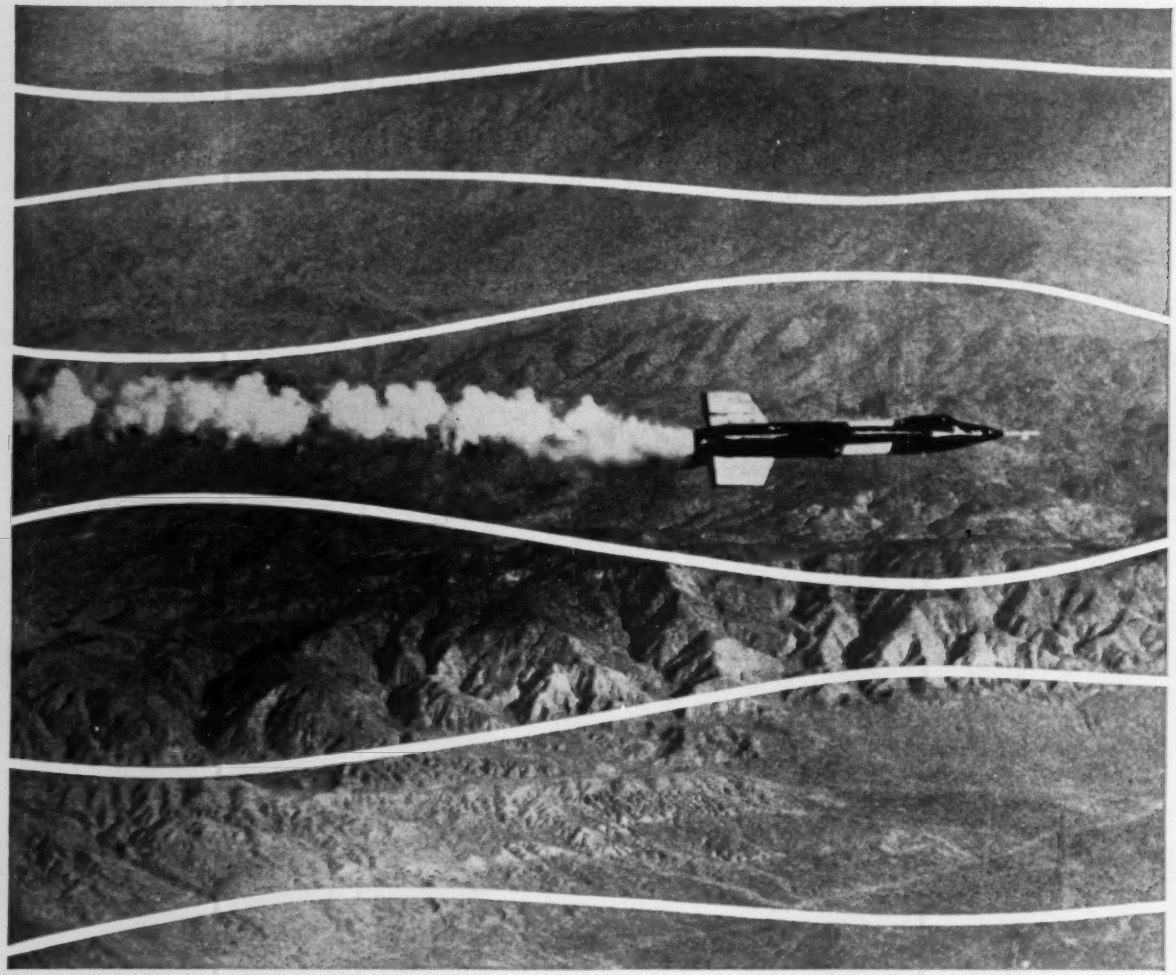
HERO

Steel *for Strength . . . Economy . . . Versatility*

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

BETHLEHEM STEEL

BETHLEHEM STEEL



For the star-chasing X-15

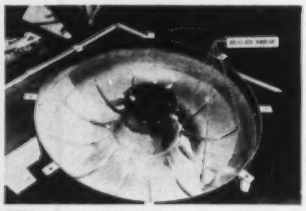
SCOTCH-WELD® SOLVES FUEL FLOW PUZZLE, SEALS PRESSURE BULKHEADS TO 3,700 PSI

BRAND STRUCTURAL ADHESIVE

One of the design puzzles North American had to solve before its X-15 could rocket into space: effective sealing of fuel tanks. Ammonia, one of the liquids which fuel the Mach-busting X-15, is carried in a compartmented tank of Inconel riveted to aluminum. Segmented bulkheads must be perfectly sealed or the fluid will not flow from one compartment to another. Of the many sealants tested, only SCOTCH-WELD Brand Structural Adhesive Film produced the seal required in the face of ammonia, other cryogenic fluids, and the extreme temperature and pressures encountered.

SCOTCH-WELD adhesives have hundreds of applications—wherever there's a problem of fastening or sealing metal to metal, or to other materials. They resist ozone, acids, water, jet fuels, other corrosives. And provide shear strength of plus 3,700 psi at 70°F., 1,650 psi at 300°F. They contain no solvents—fume disposal and drying problems don't exist! The same 3M research that created these SCOTCH-WELD adhesives can help solve the fastening problems that may be plaguing you. Why not ask your 3M Field Engineer? Or write AC&S Division, 3M Co., Dept. SBEE-41, St. Paul 6, Minn.

"SCOTCH-WELD" is a reg. TM of 3M Co.



Wherever the riveted metals of the tank meet, a SCOTCH-WELD adhesive seal provides continuous contact between mating surfaces, acts as a continuous insulating barrier of uniform thickness.

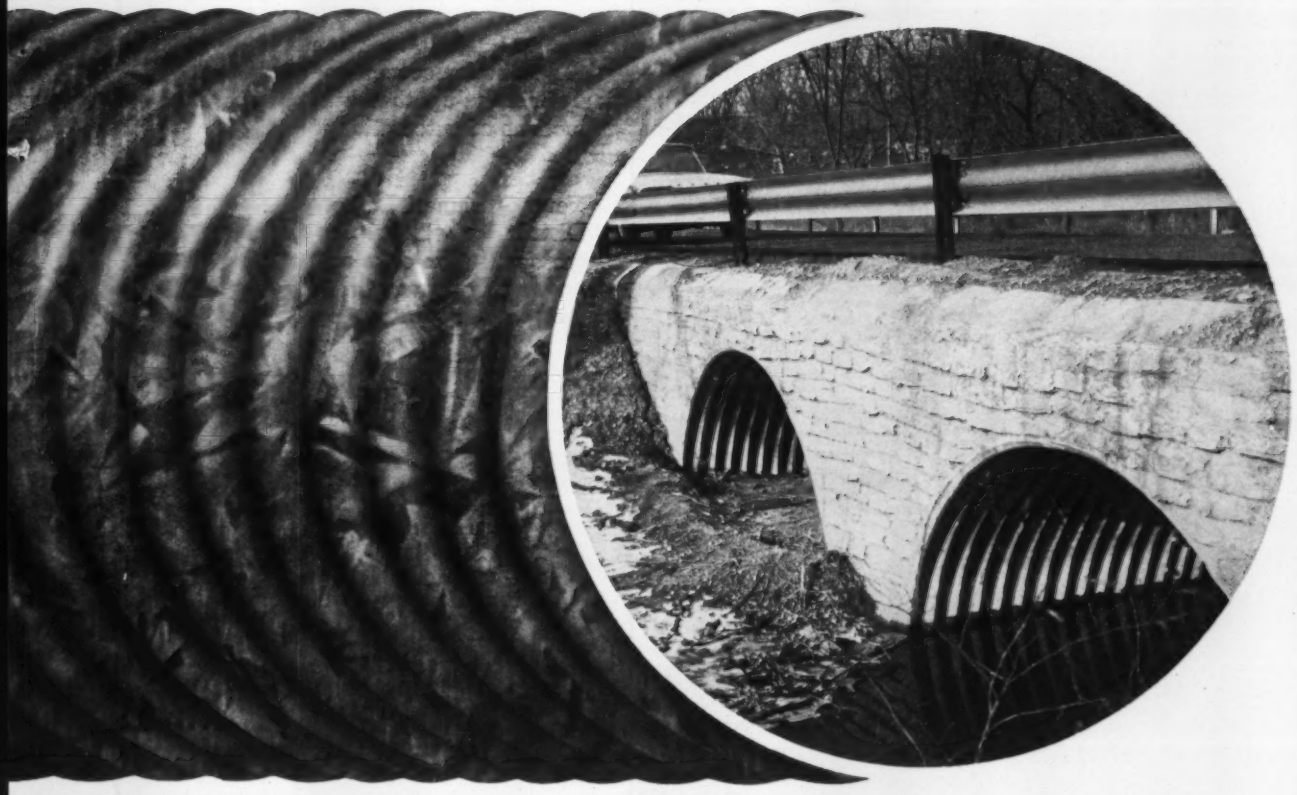
ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

Guardrails and culverts live longer . . .



GUARDED BY GALVANIZED STEEL

Wherever traffic or drainage flows, you'll find modern galvanized steel at work. In guardrails, for example, where nothing quite matches galvanized steel: the strength of the steel for impact; the coating of zinc for durability and ease of maintenance; the economy of the combination. And in culvert pipes, where the exceptionally high strength-weight ratio of this zinc-coated metal brings cost per year down to the barest minimum.

WEIRKOTE® IN PARTICULAR—You gain when you specify long-life galvanized steel for guardrail and culvert installations. And you gain even more when you specify National Steel's Weirkote. To the inherent strength of steel, Weirkote adds *enduring* zinc protection. Weirkote is manufactured by two National Steel divisions, Weirton Steel and Midwest Steel. For further details, write Weirton Steel Co., Weirton, West Virginia.

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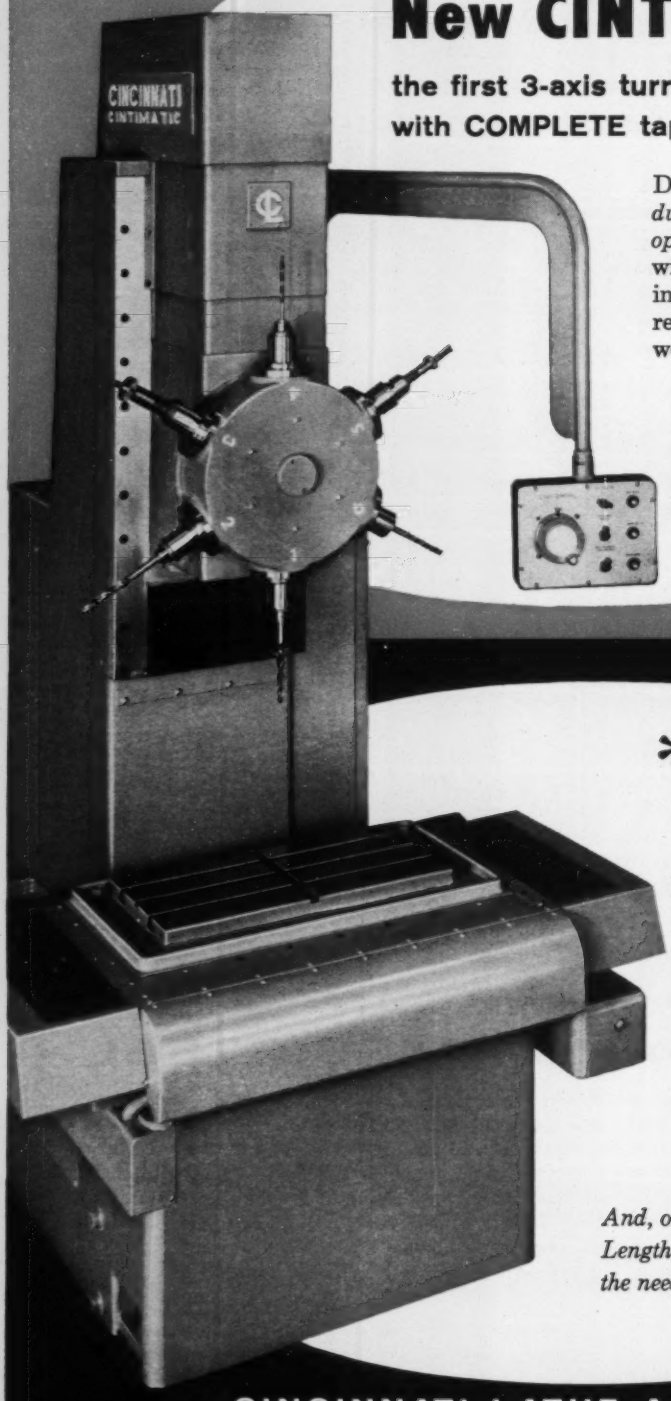

New CINTIMATIC...

the first 3-axis turret drill with COMPLETE tape control*

Drill, tap, ream, counterbore PLUS *dwell, finish bore, and light milling operations!* Here's toolroom versatility with production economies—and, amazingly fast set-up that brings the cost reductions of automation to short-run work.

Your Cincinnati Lathe and Tool Distributor will help evaluate the application of CINTIMATIC automation to your drilling jobs. Or, write for catalog.

* **Only CINTIMATIC automatically controls selection of all machining functions entirely by tape!**

- Feed selection for both turret and table
- Random tool selection from six spindles
- Automatic positioning of work table with 16″ x 30″ travel
- Multiple depth selection for each spindle
- Selection of 16 spindle speeds for each spindle
- Tap, dwell, and milling cycles

And, only CINTIMATIC *provides "Tool Length Compensator"—eliminates the need for controlled tool length.*

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CINCINNATI 9, OHIO

HYDRASHIFT Lathes / CINCINNATI Drilling Machines / SPIROPOINT Drill Sharpener

CINTIMATIC Numerically Controlled Lathes and Drills

That's the title of a film put together by Master Chemical Corp., Toledo, Ohio. We're interested because some of the material in it is based on data we published in our first impact issue, Fight for Survival, last Sept. 5. First official showing of the movie will be Apr. 14 at the Chemists' Club in New York.

Incidental Intelligence

Tass, the Soviet news agency, has paid $2 for a reprint of our impact report on People Power which appeared Jan. 2, 1961.

Down with Price Fighting

While we're still on the subject of impact issues, let's remind you that a third one is coming your way Apr. 17. It will detail the causes, forms, and effects of price fighting, described by you readers as metalworking's most splitting headache of 1961.

The editors will be prescribing plenty of remedies next week.

That's How It All Began

The track width of chariots marked the lane width of roads as Roman legions pushed the empire across Gaul and Britain. That span later influenced the rail spacing for horse drawn cars and eventually the gage of modern railroads—to fix forever the limit you can put across a flatcar and still traverse the nation's bridges and tunnels.

When we were given the above information by Geraldine, our cleaning woman and night editor, we thought she had been browsing in the *Encyclopaedia Britannica* again. Not at all. The intelligence was contained in a news release from Resistoflex Corp., Roseland, N. J., as an introduction to a description of how its Fluoroflex-T (Teflon) product helped General Electric Co. boost the capacity of its generators without increasing size, which was limited by the width of railroads.

We wish more releases read like Resistoflex's—and magazine stories too.

Horror

You will remember that on our Mar. 20 cover we carried a photo of a machine operator's look of agony at the mess he had made as a result of machining mistakes. The picture illustrated a story on that subject (reprints of which are still available, by the way).

Well! The correspondence that photo generated has staggered us. The letter we like best is from Algird C. Pocius, managing editor of Colorado Fuel & Iron Corp.'s employee paper.

He writes: "That look of agony isn't from disgust at doing a poor job—he probably got chips in his eyes. No safety goggles . . . P.S. The article was good."

The absence of safety goggles was the first machining mistake, and the others followed from the bad start.

Picture Worth 1000 Words?

The Chinese philosopher who said that was not necessarily right all the time. But an occasion when the axiom holds true occurs on Page 53. Associate Editor George Howick had the tough job of trying to find an illustration for his article on controlling indirect labor costs, the seventh in our 25 part series concerning profit growth.

Photographer Bruce Wilson came up with the solution (the accompanying photo is a sample).

With a bit of stage management, some professional models, and the co-operation of Solon Foundry Inc., Solon, Ohio, and Hatfield Electric Co., Cleveland, he got shots of people goofing off on purpose.

They were all understandably reluctant to be pictured in such uncomplimentary roles, but we promised to report that they were only kidding.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

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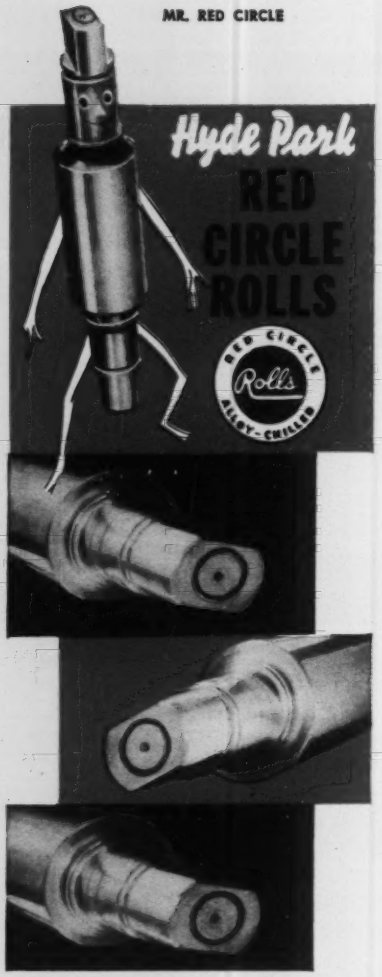

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Our engineers will be glad to work with you in the production of any special rolls or rolling mill equipment.

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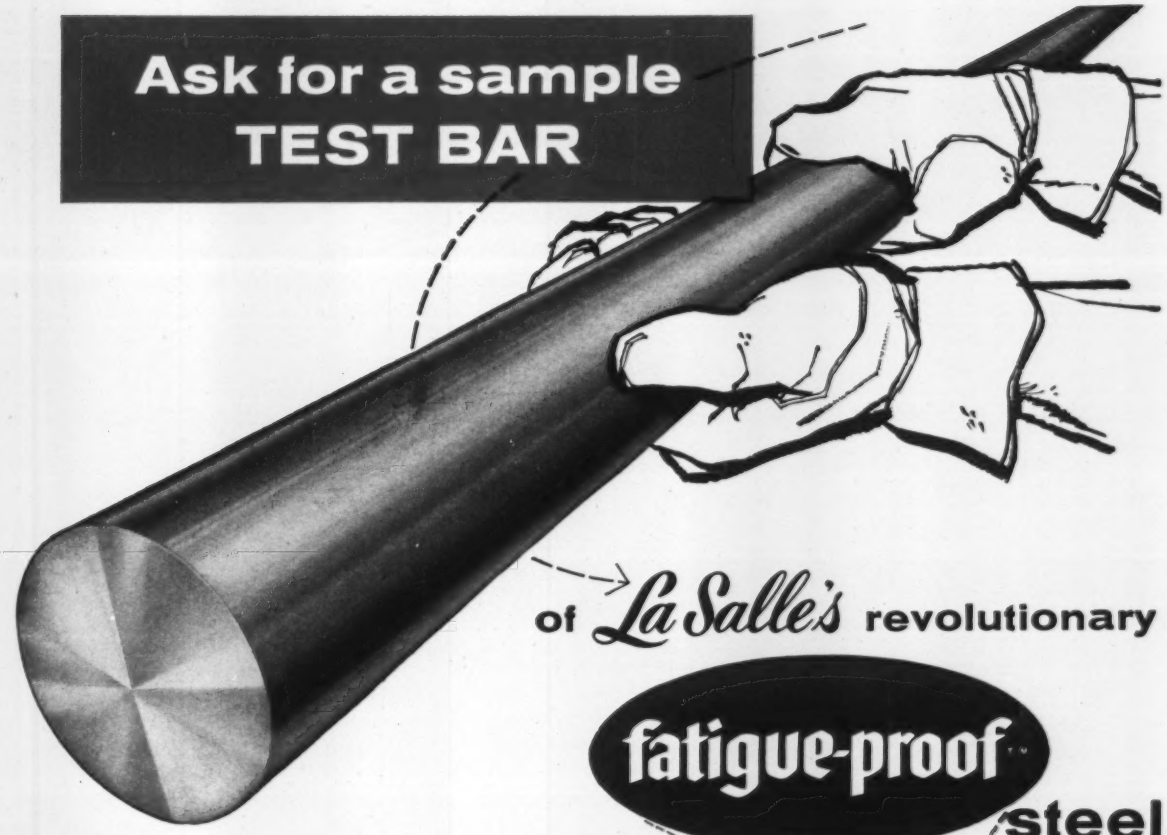


of La Salle's revolutionary

fatigue-proof steel

The steel bar that has high strength WITHOUT HEAT TREATING

Yes, La Salle invites you to test a sample bar of the remarkable new FATIGUE-PROOF. This amazing new material is its own best recommendation . . . as proven by the many original equipment manufacturers who have already tested (and are using) FATIGUE-PROOF.

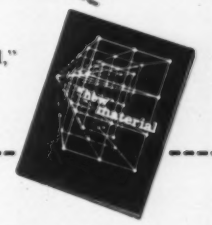
If you are making parts requiring strengths in the tensile range of 140,000 to 150,000 psi, and want to eliminate the expense or problems of heat treating . . . if you want to save production costs with a bar that machines faster (25% faster than annealed alloys—50% to 100% faster than heat treated alloys) and gives you a beautiful finish, too . . . if you want to improve the quality of your product while saving money, send us a blueprint, drop us a note giving application details, or better yet . . . pick up your telephone and call a La Salle sales engineer (REgent 4-7800, Chicago, Illinois).

MADE BY THE e.t.d. PROCESS

Elevated Temperature Drawing

FREE

Get your copy of "a new material," a 24-page booklet which gives detailed information on La Salle "FATIGUE-PROOF"® steel bars.



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Manufacturers of America's Most Complete Line of Quality Cold-Finished Steel Bars

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FOR THE MACHINERY PART

THAT TAKES THE BEATING

A cut-off knife made of HAYNES STELLITE alloy No. 19 slices through molten glass at 2200 deg. F. Despite the intense heat of the glass being molded into tumblers, and the severe erosive action of the glass on metal, the cut-off knife maintains a 0.015-in. clearance between itself and the mold ring . . . *far longer than any other material ever used.*

Are you looking for a tough metal part to improve your machinery? It will pay you to look into HAYNES alloys. There are more than 15 from which to choose, including HAYNES STELLITE cobalt-base alloys, HAYNES iron-base alloys, HAYSTELLITE cast tungsten carbide, and HASTELLOY nickel-base alloys. They are available as castings, forgings, completely fabricated parts, or as sheet and bar stock. Parts can be furnished machined or ground to specified size and finish.

Our engineers will help you pick the right HAYNES alloy to resist many conditions of wear, heat, or corrosion.

HAYNES Alloys *will do the job!*

HAYNES ALLOYS

HAYNES STELLITE COMPANY

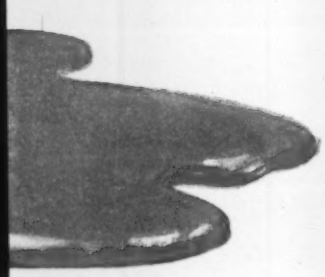
Division of Union Carbide Corporation

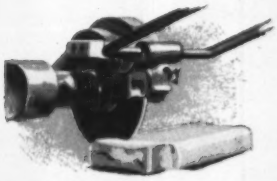
Kokomo, Indiana

UNION CARBIDE

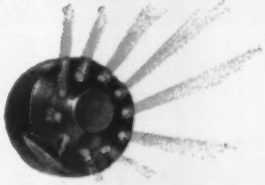
The terms "Haynes," "Haynes Stellite," "Hastelloy," "Haystellite" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

TYPICAL "HAYNES" ALLOY MACHINERY PARTS





Tough, long-lasting metal-cutting saws over 20 inches in diameter, made of HAYNES STELLITE alloy sheet, slice the tops off copper ingots.



Steam atomizer fuel burner nozzles of HASTELLOY alloy C resist corrosive agents and erosion for months, retaining essential contours.

High-temperature strength and corrosion resistance of diesel combustion chambers made of HASTELLOY alloy C make them "good for life of the engines."

Tape Recording

Chart Recording

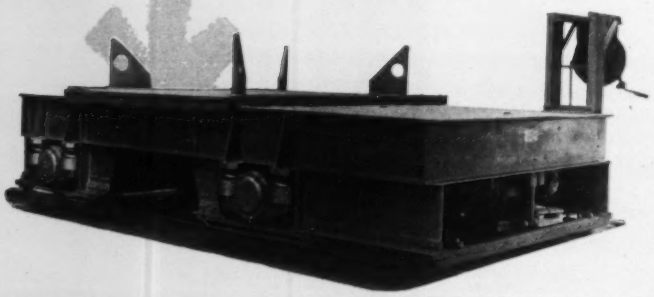
Atlas Builds Electronic Scales for-

Blast furnace scale cars

Coke weighing

Scrap bucket charging

This 60-ton scale car handles scrap buckets from the scrap yard to electric furnaces. For safety, the operator controls the car movement from a remote location. The electronic scale dial is mounted where the crane operator can watch it while loading the car.



60-Ton Electronic Scale Car

ATLAS CAR & MFG. CO.

1100 IVANHOE ROAD / CLEVELAND 10, OHIO

CALENDAR OF MEETINGS

Apr. 18-20, Light Metals Symposium: U. S. Army Engineer Research & Development Laboratories, Ft. Belvoir, Va. Chairman: William H. Baer.

Apr. 21-22, University of Wisconsin: Engineering Institutes, mechanical engineering refresher course, 3030 Stadium, Madison 6, Wis. In charge: Cass F. Hurc, University Extension Division.

Apr. 24-26, American Management Association: Marketing conference, Roosevelt Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y.

Apr. 30-May 3, National Screw Machine Products Association: Annual meeting, Somerset Hotel, Boston. Association's address: 2860 E. 130th St., Cleveland 20, Ohio. Executive vice president: Orrin B. Werntz.

May 1-2, American Zinc Institute Inc.: Joint annual meeting with Lead Industries Association, Drake Hotel, Chicago. Institute's address: 292 Madison Ave., New York 17, N. Y. Executive vice president: J. L. Kimberly.

May 2-3, Lead Industries Association: Annual meeting, Drake Hotel, Chicago. Association's address: 292 Madison Ave., New York 17, N. Y. Secretary-treasurer: Robert L. Ziegfeld.

May 3-13, United States World Trade Fair: Machines, machine tools, hardware exhibits, Coliseum, New York. Contact: David J. Jacobson, United Public Relations Inc., 120 E. 56th St., New York 22, N. Y.

May 8-10, American Society of Lubrication Engineers: Annual meeting and exhibit, Chase-Park Plaza Hotel, St. Louis. Society's address: 5 N. Wabash Ave., Chicago 2, Ill. Executive secretary: Calvert L. Willey.

May 8-12, American Foundrymen's Society: Annual convention, Brooks Hall and Civic Auditorium, San Francisco. Society's address: Golf and Wolf Roads, Des Plaines, Ill. General manager: W. W. Maloney.

May 9-11, Material Handling Institute Inc.: Technical conference and Eastern States Show, Trade and Convention Center, Philadelphia. Information: Shea Expositions Corp., 1 Gateway Center, Pittsburgh 22, Pa. General conference chairman: Robert B. McKee.

Four outstanding advantages of the all**NEW** Landis Centerless Grinder

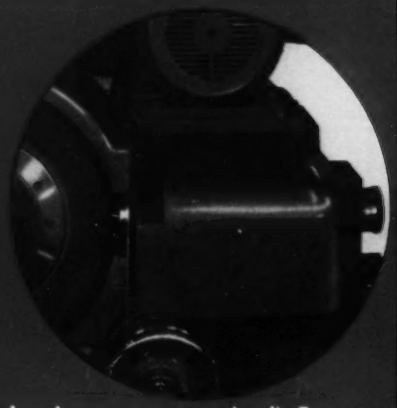
This completely new 12R machine is the finest centerless grinder available anywhere in the world. It will grind parts at a faster rate and to even closer tolerances than was possible before.

LANDIS

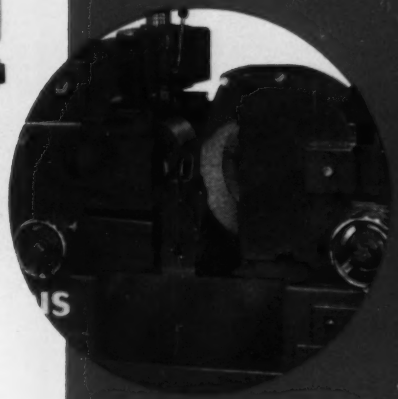
world leader in precision grinders

LANDIS TOOL COMPANY, WAYNESBORO, PA.

Faster grinding cycles with exclusive Landis Lockspeed regulating wheel drive.

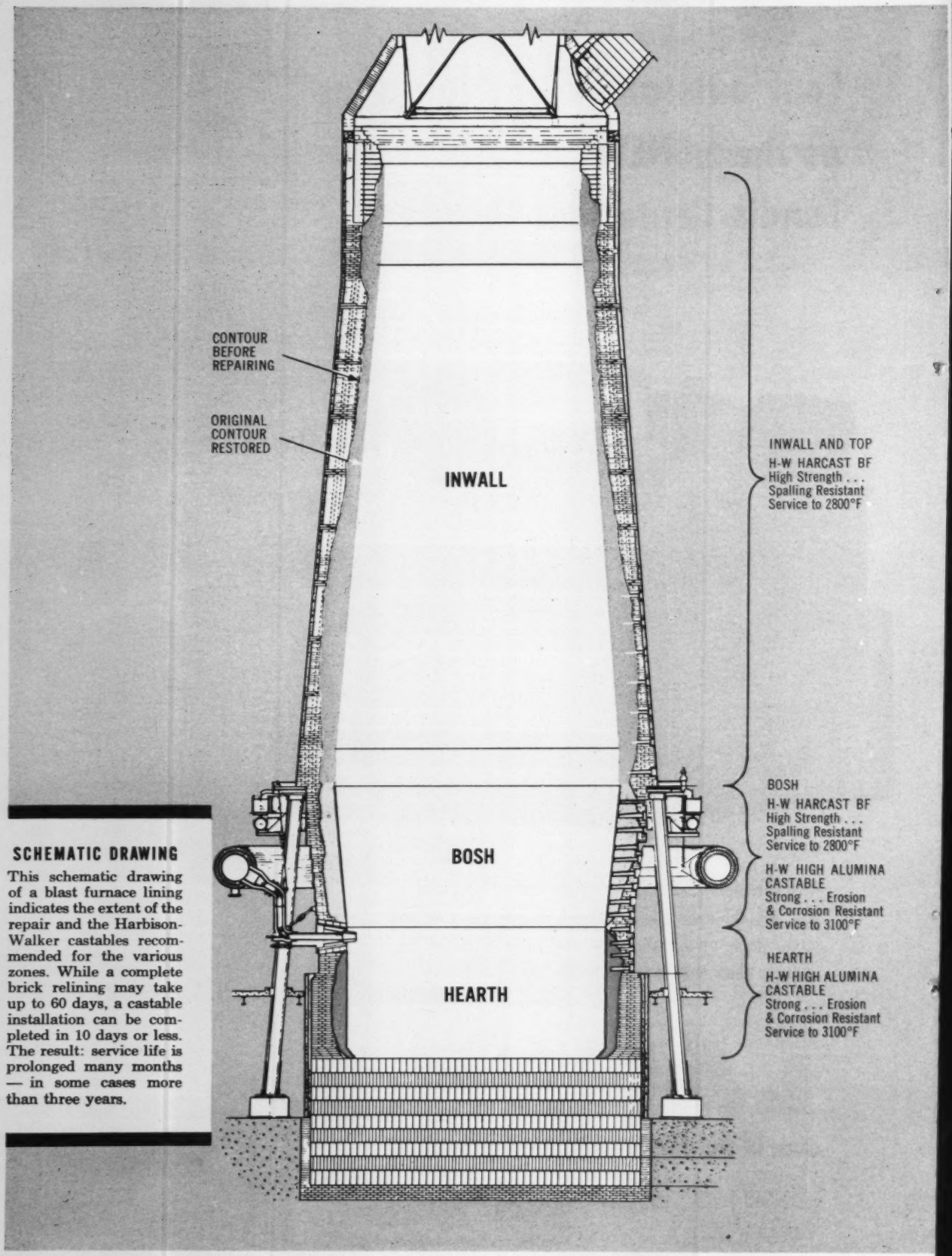


New dressing accuracy . . . Landis Truform dresser gives exact duplication of the profile on the wheel.



Greater machine stability . . . surface plate ribbing of cast bed maintains perfect alignment of ways for both wheelheads.

Close tolerances . . . work rest solidly mounted on bed with support directly to the base for heavy stock removal.



SCHEMATIC DRAWING

This schematic drawing of a blast furnace lining indicates the extent of the repair and the Harbison-Walker castables recommended for the various zones. While a complete brick relining may take up to 60 days, a castable installation can be completed in 10 days or less. The result: service life is prolonged many months — in some cases more than three years.

HARBISON-WALKER
CASTABLE REFRACTORIES
greatly extend life of blast furnace linings

EFFECTIVE MAINTENANCE IN MORE THAN A DOZEN PLANTS. Hundreds of thousands of additional tons of iron have been produced in these blast furnaces since their worn linings were repaired with Harbison-Walker castable refractories.

A few years ago, these linings would have had to be completely replaced. With today's castable maintenance procedure, furnace relinings can be postponed as much as three years. An important advantage is that while a brick relining may take from 40 to 60 days, a castable installation can be completed in 10 days or less, depending upon the extent of repair.

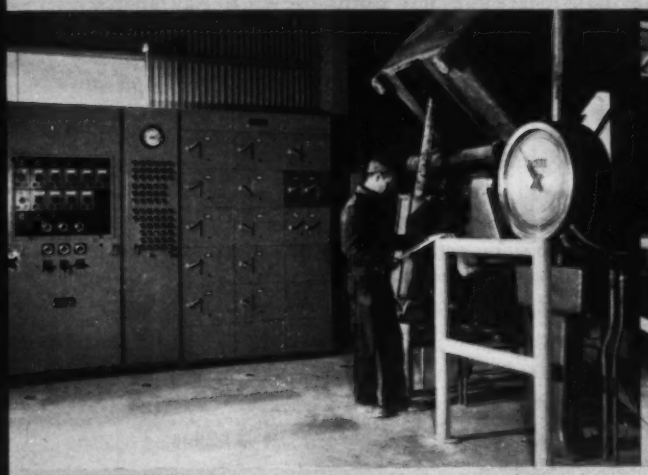
Harbison-Walker's low-iron castables—HARCAST BF and H-W HIGH ALUMINA CASTABLE—were specially developed for this type of service. Imperative to successfully extending lining life is the selection of the best products and the adaptation of the best possible installation techniques.

Write the Harbison-Walker Specialty Sales Department for complete information.

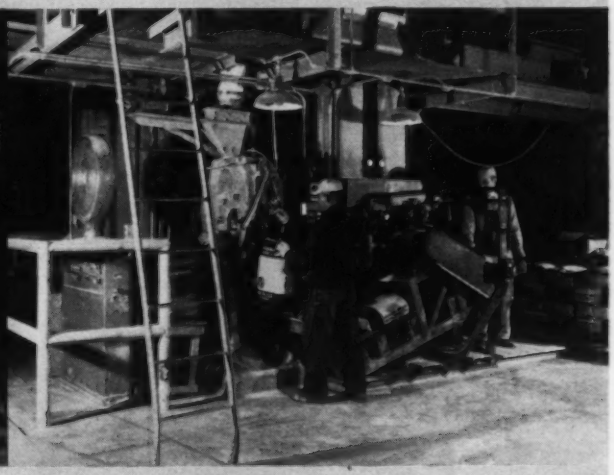
HARBISON-WALKER REFRACTORIES COMPANY
AND SUBSIDIARIES **General Offices: Pittsburgh 22, Pa.**
World's Most Complete Refractories Service

HW-61-1

QUALITY CONTROL (from batching to sacking) IN THESE NEW MANUFACTURING FACILITIES



In this new Harbison-Walker specialties plant where castables are produced—precision batching is assured through utilization of the latest modern equipment.

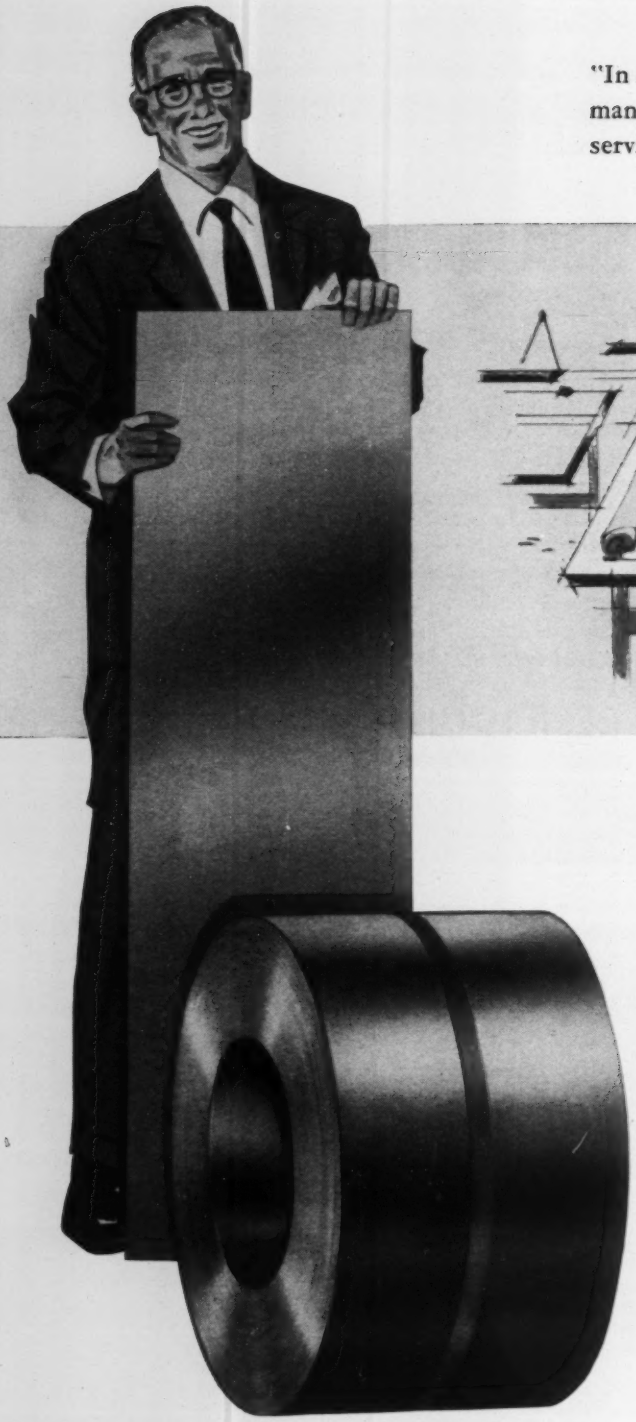


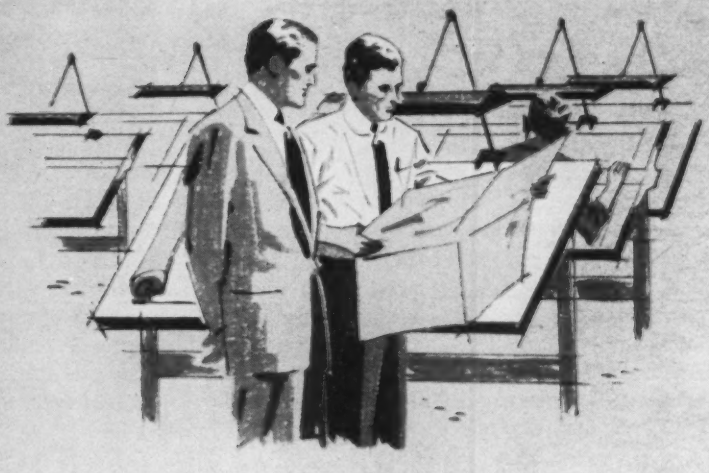
Strict quality control—from batching to sacking—in Harbison-Walker's specialties manufacturing provides highest quality castables available—anywhere.

Metallurgist Harold Greene tells

HOW REPUBLIC SHEET AND TO MEET YOUR

"In my 33 years as a Republic Metallurgist, I've seen many new developments in steel, and changes in service to customers. One of the most important to





CUSTOM METALLURGICAL SERVICE

"Our Custom Metallurgical Service is tailored to individual customers' needs. We try to stay flexible—study plans, blueprints, and product requirements with a customer's engineers—look over dies and production facilities with his production people—get the facts about cost limitations from purchasing.

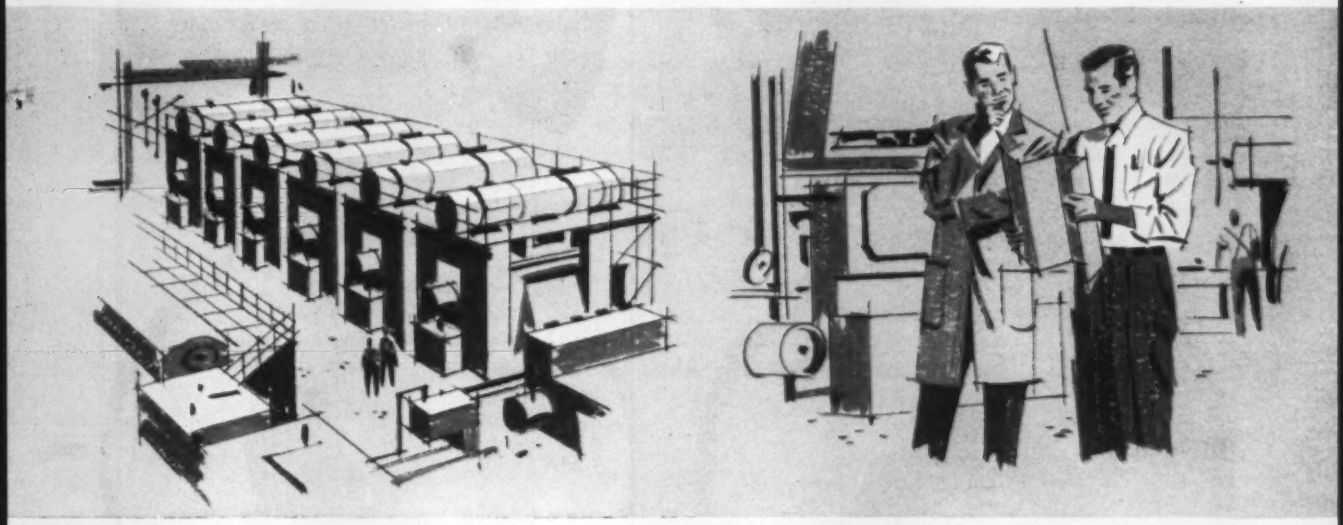
Our field work is backed by Republic's metallurgical laboratories, among the largest and best equipped in the world. In the end, our Custom Service is aimed at one thing—when we make a steel recommendation, we're sure it's the right one, and so is the customer."

Steel

Strong, Modern, Dependable

STRIP ARE CUSTOM MADE REQUIREMENTS

our customers is what we call Custom Service to give you Custom Made hot and cold rolled sheet and strip. Here's how it works:



FULL RANGE CAPABILITIES— EXTRA MEASURE OF QUALITY CONTROL

"Of course, it doesn't do any good to come up with precise sheet steel recommendations if you can't meet them. Here's where Republic puts its full range capabilities to work. We can pinpoint *complete* specifications on an order and know the Republic mills can meet them. For example, we're one of the few mills that produce sheets up to 90″ wide, and, on the other hand, have facilities for rolling narrow widths in strip categories.

And when it comes to quality control, the latest equipment, like the new Surfacount electronic surface classifiers in our Warren, Cleveland, and Gadsden mills, assures that custom made Republic Sheet and Strip have the exact surface quality, physical uniformity and gage that our customers require."

FOLLOW UP SERVICE

"Our Custom Service doesn't stop when an order is delivered. Republic Field Metallurgists stay with a job—and, if trouble develops, they're right there quickly to help iron out the difficulty. All added up, it means that when a manufacturer does business with Republic, he gets more for his money—more service, better quality steel."

For more information on Republic Custom Service and Custom Made Hot and Cold Rolled Carbon Sheet and Strip, write Republic Steel Corporation, Department ST-1596-B—1441 Republic Building, Cleveland 1, Ohio.

Republic Sheet and Strip Products include:

HOT AND COLD ROLLED CARBON STEELS • ELECTRO PAINTLOK® GALVANIZED • GALVANNEALED • STAINLESS • HIGH STRENGTH ALLOY • TITANIUM

REPUBLIC STEEL

Cleveland 1, Ohio

World's Widest Range of Standard Steels and Steel Products

Save on any size rings with Amweld

Amweld makes flash butt-welded rings in diameters of four inches to eight feet and offers ring customers a sizable cost reduction in every case. Amweld rings save on metal, because rings are formed to or near finished dimensions. Amweld rings save on machining, because the metal is left out—not hogged out. Important to you, Amweld can flash weld rings from almost any metal alloy, common or exotic.

Savings to all Amweld customers totaled over one million dollars last year. One Amweld customer saves by using Amweld rings as gear blanks. Another saves by using Amweld rings as tank flanges. A third saves on rings for jet engine applications. It doesn't cost a thing to think on paper with Amweld. So let us quote you for your cost comparison. Write today: The American Welding & Manufacturing Co., 801 Dietz Road, Warren, Ohio.

AMWELD®

INDUSTRIAL PRODUCTS

THE AMERICAN WELDING & MANUFACTURING CO., WARREN, OHIO

STEEL
The Metalworking Weekly

Metalworking Week®

April 10, 1961

Steel Unemployment Is Cyclical, Not Technological

"The problem of unemployment in steel results primarily from cyclical rather than technological causes," R. Conrad Cooper, executive vice president-personnel services, U. S. Steel Corp., told the House Subcommittee on Unemployment and the Impact of Automation. He pointed out that the late 1959 bulge in demand resulting from the steel strike forced U. S. Steel alone to hire 7000 new employees. As the bulge turned into a dip, more people were counted as unemployed from steel than would otherwise have been the case.

March Employment Figures Hint of Upturn

Employment rose more than seasonally in the month to mid-March, reaching a record March total of 65.5 million, the Labor Department reports. The increase was about 40 per cent greater than the normal seasonal rise. However, unemployment dropped by a less-than-seasonal 210,000 to a mid-March total of 5.5 million. So the seasonally adjusted rate of unemployment rose from 6.8 to 6.9 per cent of the labor force, although the actual rate fell from 8.1 to 7.7 per cent.

Indirect Labor: Idle Army, $7 Billion Opportunity

"Plants using incentives for indirect labor report gains in productivity ranging from 25 to 93 per cent, while improvements of 60 per cent are typical. That means incentives boost indirect productivity another 20 to 30 per cent above the improvement obtained through work measurement," says John W. Roberts, president, Albert Ramond & Associates, Chicago. And work measurement itself can boost productivity as much as 50 per cent. For tips on measurement, methods, and mechanization that can hike the efficiency of your indirect workers, see Page 53.

Six More Metals to Get Government Exploratory Aid

Secretary of the Interior Stewart Udall has added iron ore, gold, silver, bismuth, sulfur, and tellurium to the list of commodities that get exploration assistance from the Office of Minerals Exploration. The government will contribute 50 per cent of the total allowable costs of exploration for each of the six. Other minerals on this list include antimony, cadmium, cobalt, copper, lead, molybdenum, zinc, selenium, uranium, thorium, and rutile. Secretary Udall also enlarged the list of minerals for which the government will contribute 75 per cent of the total allowable exploratory costs. This list now in-

cludes beryllium, bauxite, chromite, columbium, manganese, mercury, mica, nickel, tantalum, tin, platinum group metals, and piezoelectric quartz crystal.

Mechanization on the Farm Means Market for Metalworking

Agriculture will continue to furnish a capital goods market of $3.5 billion to $5 billion annually, says the Farm Equipment Institute. Rapid farm mechanization is opening many new markets for metalworking products (Page 43). Improved technology has enabled farmers to raise output per manhour 80 per cent since 1940 and output per farm 74 per cent. Capital investment per worker jumped from $3413 in 1940 to $21,303 in 1960.

Exports Rise in February

U. S. exports of nonmilitary merchandise in February exceeded $1.6 billion—up 4 per cent from the January total. Seasonally adjusted, the rise amounts to 7 per cent. In 1961's first two months, exports came to $3.14 billion vs. $2.98 billion in the like 1960 period.

Who Got the Steel in 1960?

On Page 126, you'll find a special report on who bought what steel in 1960. To whet your appetite, here's a broad breakdown that shows customer industries as a percentage of the steel market:

Automotive	20.53%	Machinery	5.56%
Service centers, distributors	17.54	Contractors' products	5.06
Construction	13.58	Converters	4.12
Containers	9.03	All others	24.58

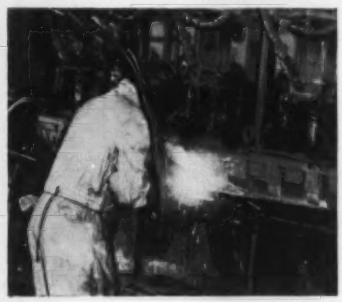
Contour Cable to Give Missiles Svelte Waistlines

These flowing spirals of Hughes Aircraft Co.'s new "contour cable" were developed to replace bulkier round wiring in missiles. Flat metal strips are imbedded in plastic dielectric ribbon, cutting weight to about half that of conventional cable. The strips of plastic, about the same thickness as the cover of a paperback novel, will carry up to 40 separate conductors. The flat cable can have an adhesive backing, be stuck to the inner wall of a missile, shaping itself to the fuselage contours.

Water Desalters to Be Mass Produced

Fairbanks Whitney Corp. and the government of Israel, in a joint venture, have built a desalting unit that converts sea water into fresh water "economically." The company has started tooling up for mass production at its Beloit, Wis., plant. "Line production is scheduled to start this year," says President David Karr. The first desalting unit will be installed at Elath, Israel, by yearend. It'll convert about 250,000 gallons of sea water daily.

Are You Keeping Pace with Welding Advances?



The workman in the photo can't walk as fast as his torch can weld, so A. O. Smith Corp. has given him a conveyor-platform keyed to the speed of today's advanced CO_2 welding techniques. That's just one of many advances that experts claim are being overlooked by many managers today. You can see for yourself in the special section that begins on Page 88.

Oremet Casts Pure Tungsten

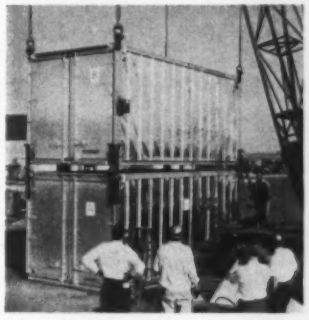
Oregon Metallurgical Corp. has succeeded in melting and casting pure tungsten, a feat that has been attempted for years. Tungsten melts at 6170° F (vs. 2700° F for steel). A cold crucible, skull melting, vacuum arc furnace, made of copper and cooled with running water is used. The melt is achieved in 5 minutes, and the pour must be made within 4 seconds. The castings are produced by the centrifugal process in hollow ring shapes up to 10 in. OD that weigh 220 lb.

Big Tungsten Find in Canada

Canada Tungsten Mining Corp. Ltd. has discovered a tungsten deposit large enough to insure 15 years' operation at a rate of 300 tons of ore concentrate daily. The mine is being developed along the Flat River about 250 miles from Whitehorse, Yukon Territory. Northwest Amax, a subsidiary of American Metal Climax Inc. will acquire a 35 per cent interest in Canada Tungsten to help finance the project. The U. S. produces less than half its tungsten needs. Red China has the world's largest reserves.

Now We Have Twin Fishybacking

Fruehauf Trailer Co. and American President Lines have started a fishybacking venture that widens the scope of land-sea container interchangeability. Two "Twin 20" Fruehauf trailers are stacked for shipment by rail and sea. The photo shows a test of the rugged sea vans. Loaded with 23 tons of cargo, they've just been dropped in a 6-G test.



Electricity from Algae and Enzymes

Dr. F. D. Sisler, Geological Survey biochemist, has developed a laboratory prototype that produces electricity directly from the decomposition of organic matter. Essentially, the energy released comes from bacteria "burning" the organic matter, but the cell design is such that the energy is released as electricity rather than heat. Inexpensive fuel can be obtained by putting live algae into sea water in the cathode section. The anode section holds sea water

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Editorial Index available semiannually.

STEEL also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

containing organic matter as fuel and enzymes (bacterial cells) as catalysts. Survey spokesmen contend that the efficiency of the biochemical fuel cell equals or exceeds that of the most advanced conventional powerplants.

Here's Average Cost of New Machine Tool

The average metal cutting machine tool purchased during 1960 had a lower price tag than the average unit purchased in 1954, the National Machine Tool Builders' Association reports. Here's the trend:

Year	Units Shipped	Average Unit Cost	Year	Units Shipped	Average Unit Cost
1920	79,000	$1918	1954	58,500	$15,251
1930	23,500	4085	1956	63,900	13,868
1940	110,000	4000	1957	53,700	15,726
1950	41,500	7363	1958	27,400	15,010
1960	34,000	14,912	1959	33,900	12,175

Employees Help Firm Become More Competitive

Members of the International Association of Machinists employed by Kaydon Engineering Corp., Muskegon, Mich., have voluntarily agreed to reduce incentive rates and increase productivity. The move has permitted the firm to: 1. Resume a five day workweek. (It was four.) 2. Predict increased employment within three to four months. 3. Plan to spend $500,000 for new equipment. 4. Obtain near-record orders in March.

Straws in the Wind

The end of the recession is close at hand or may have occurred already, says Walter Heller, chairman, President's Council of Economic Advisers . . . February sales of vacuum cleaners were 12 per cent below those in the like 1960 month, reports the Vacuum Cleaner Manufacturers Association . . . Inventories are firming up and in some cases increasing slightly, but no one seems disposed to risk an inventory buildup, reports the Purchasing Agents Association of Cleveland . . . Construction costs reached a record high this month, *Engineering News-Record* reports . . . Robert F. Moody, president, Material Handling Institute, told STEEL at MHI's spring meeting that the industry's sales this year will top 1960's by 10 per cent and improvement will continue into 1962.

Metalworking Pulse

The Business Trend: STEEL's index of industrial production held firm at 147 for the week ended Apr. 1 despite some slowdowns incurred on Good Friday. **Autos:** Output dipped for the week ended Apr. 8, the result of about 40 per cent of General Motors' productive capacity being idled. **Steel:** Not much change is expected in the ingot rate during the week ended Apr. 15 compared with the first part of the month.

- **INDUSTRIAL PRODUCTION INDEX**
  (1947-49=100)
  Week ended Apr. 1 .... 147†
  Year ago 172
  Details on Page 63
- **PASSENGER CAR OUTPUT (UNITS)**
  Week ended Apr. 8 . 85,000*
  Year ago 133,460
  Details on Page 60
- **STEEL INGOT OUTPUT (TONS)**
  Week ended Apr. 8 . 1,648,000*
  Week ago 1,632,000
  Details on Page 134

†Preliminary. *Estimated.

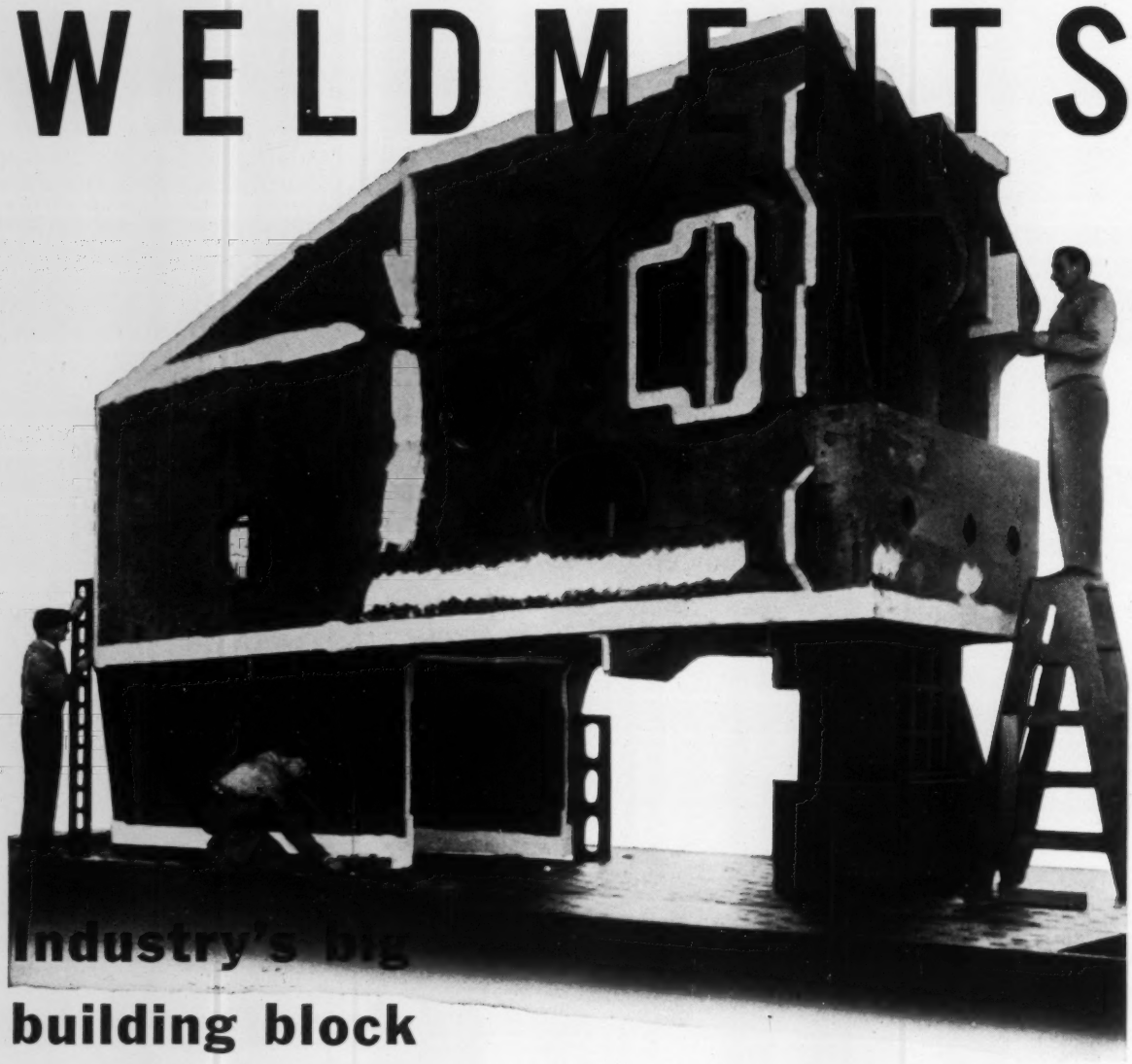
THE TRADEMARK IS CHANGED

...to match the high performance standards of the nation's top-quality electrical control equipment

Soon you will see this new trademark on Clark control devices and systems. Behind this symbol are the precise engineering and exacting production methods which make possible the high standards of quality for which Clark is famed. Behind it are men with the know-how to create the longest lived, sturdiest, most efficient electrical controls. Behind it are answers to your needs for everything from standard equipment such as motor starters, relays and push buttons to complete engineered systems.

For help in solving your control problems, contact your local Clark distributor or district sales office, or write direct. *The Clark Controller Company* • Main Plant: Cleveland 10, O.—Western Plant: Los Angeles 58, California—In Canada: Canadian Controllers, Limited, Toronto, Ont.

WELDMENTS



Industry's big building block

You're looking at a 55-ton weldment on a planer. It is typical of the machining—or building of a complete machine of any size—produced regularly in the Sun Ship machinery plant where marine and industrial equipment is built.

In our tank and steel fabricating shop, we build pressure vessels, fractionating towers, weldments, and heavy steel fabrications.

Our completely integrated shops concentrate facilities and skills for producing special machinery and components that meet the most critical standards.

When you need special machinery of any kind, you will want to discuss methods, equipment requirements and possible production layouts with Sun Ship's sales engineers.

Sun

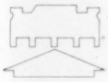
SHIPBUILDING & DRY DOCK COMPANY

ON THE DELAWARE • SINCE 1916 • CHESTER, PA.

When you think of PRECISION

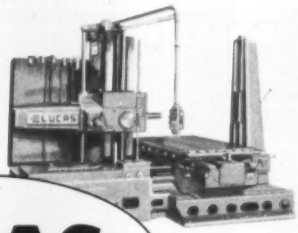
For life time precision Lucas provides

airlift to saddle

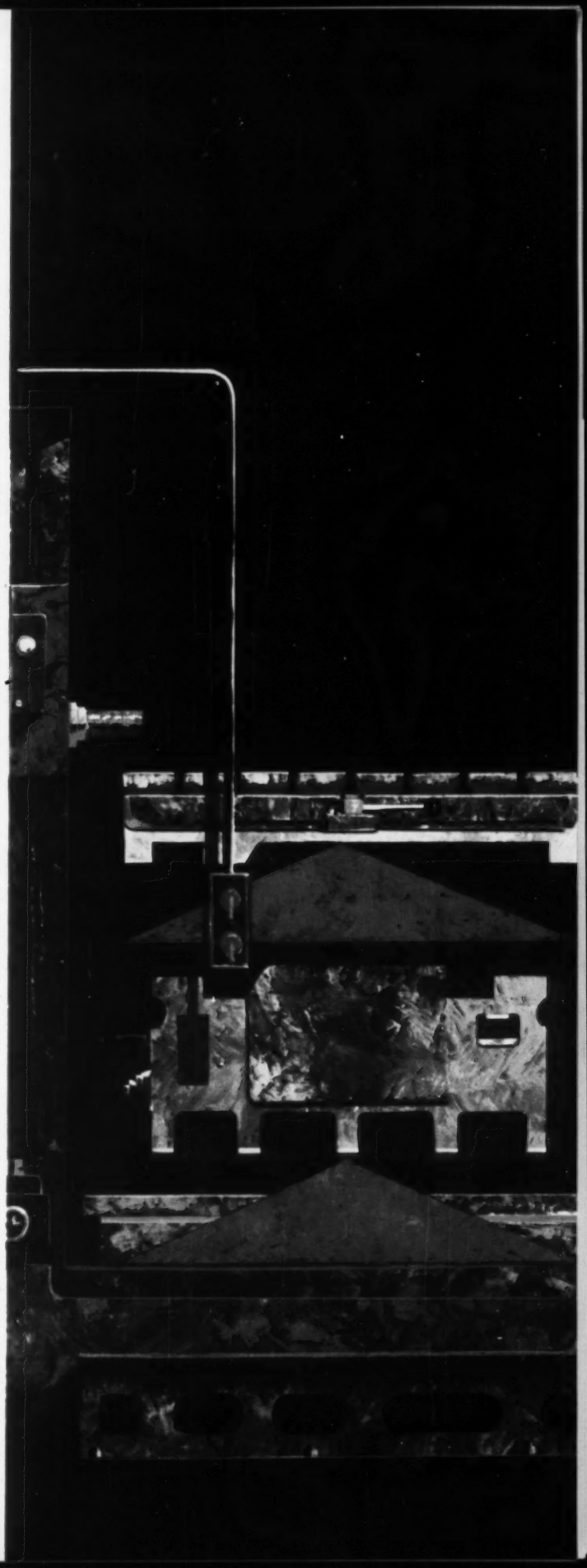
and table. 

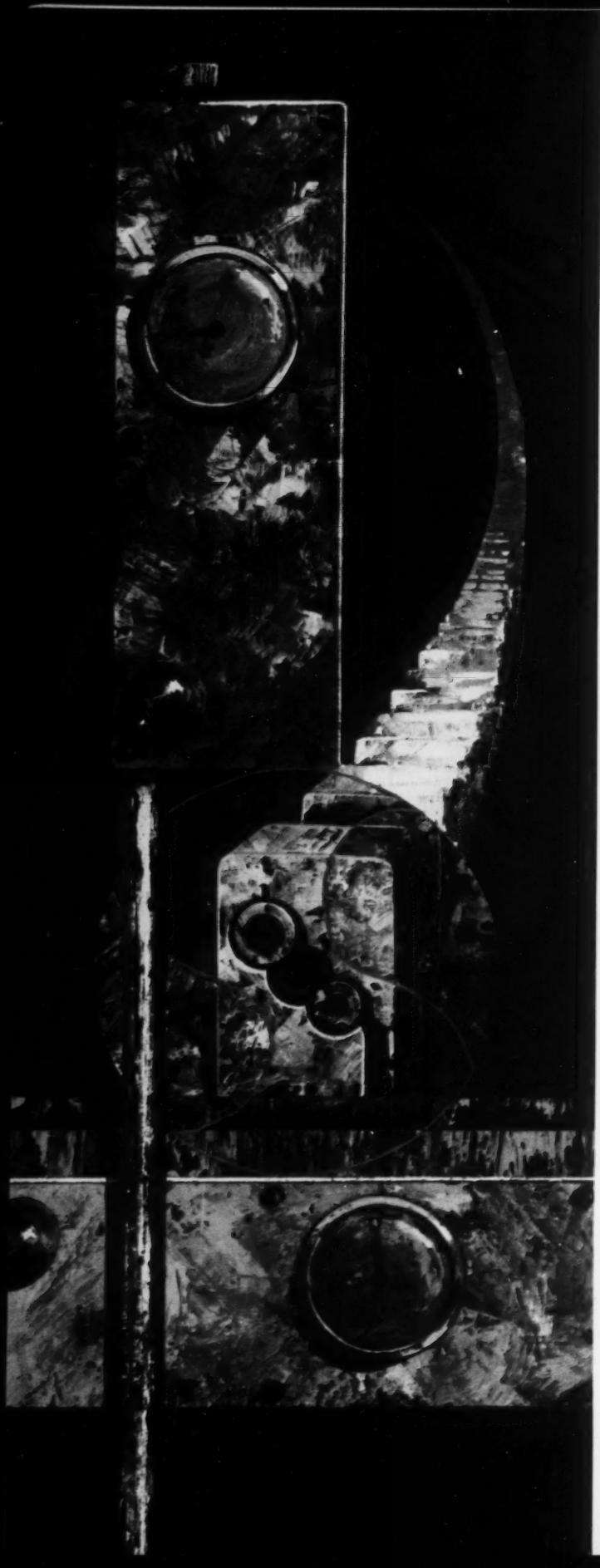
These elements are supported on a thin film of lubricated compressed air during traverse. This separation of metal from metal virtually eliminates wear. During machining cycles the saddle and table are automatically clamped down tight to provide absolute rigidity for even the heaviest cuts. Unclamping is automatic, too. These are two aspects of Lucas design which contribute to the precision of these machines. Lucas Machine Division, The New Britain Machine Company, 12302 Kirby Avenue, Cleveland, Ohio. When you think of Precision . . .

think of . . .



LUCAS
PRECISION





When you think of RELIABILITY

Lucas automatic power positioning

automatically repeats

automatically repeats

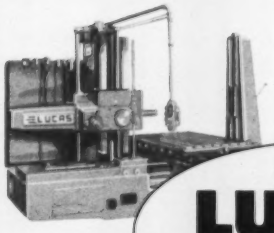
automatically repeats

to ±.0001 . . .

A simple, completely reliable system of dial indicators, end measures, and electrical controls automatically disengages rapid traverse, engages the fixed, constant-rate power feed and precision stops the unit at predetermined settings. Automatic power positioning assures the highest order of repetitive accuracy with an absolute minimum of operator attention.

A new catalog describes our complete line of horizontal boring, drilling and milling machines. Write Lucas Machine Division, The New Britain Machine Company, 12302 Kirby Avenue, Cleveland, Ohio. When you think of Reliability . . .

think of . . .



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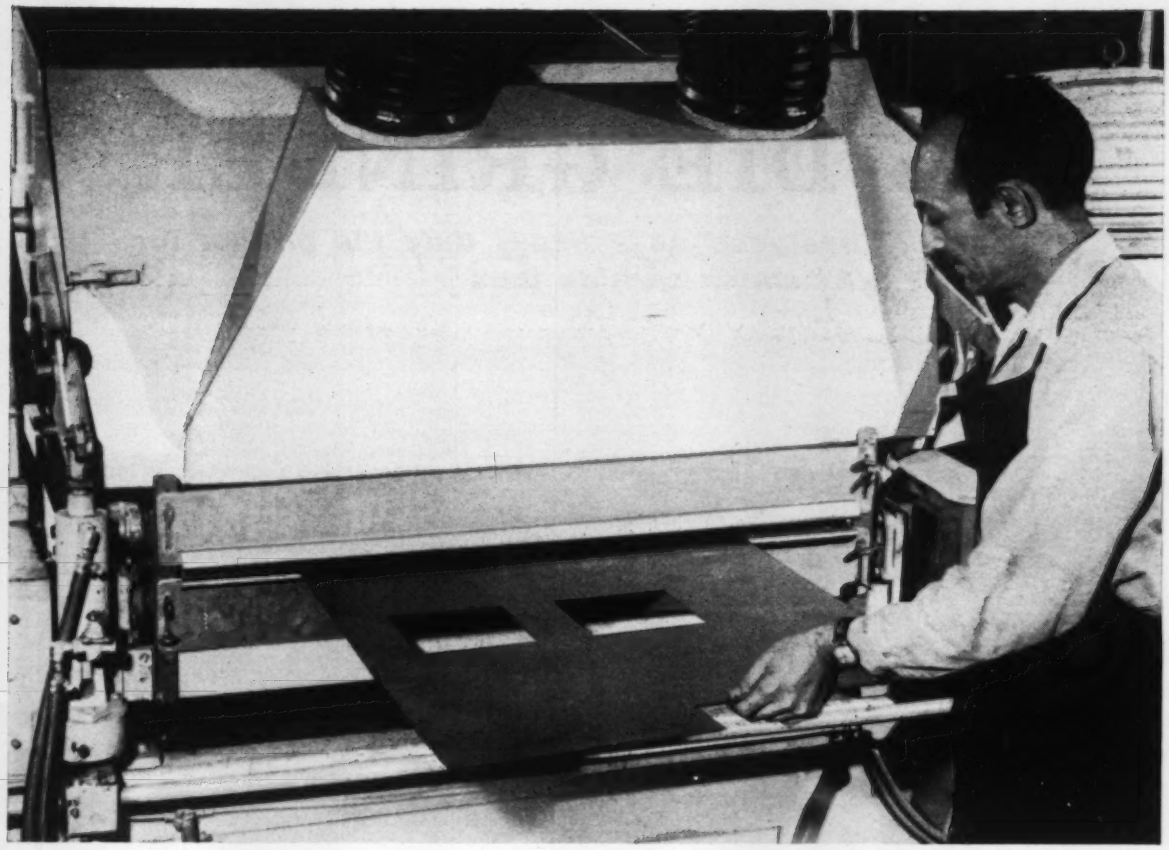

3M Abrasives Help AMF Reduce Sheet Metal Deburring Costs

Innumerable ferrous and non-ferrous sheet metal components are manufactured for cigarette, cigar, bakery, and Automatic Pinspotter Machines at the American Machine & Foundry's Brooklyn, New York plant. Sheared to size and punched, components must then be deburred and cleaned prior to painting and plating. The previous method, using abrasive discs, often left swirl marks which had to be removed in a secondary hand sanding operation at extra cost.

As the result of a recommendation from a 3M Representative, AMF switched to the use of a wide-belt sander and "Three-M-ite" Resinbond Cloth Belts on these operations.

The results were remarkable. The new wide-belt prefinishing method eliminated all extra re-work, provided a better pre-paint surface, and cut unit costs substantially. Unit production time was slashed from more than 9 minutes to less than 30 seconds.

Why not let 3M's new COST CHECK 5-4-5 Program help you to effectively investigate ways to lower costs and increase profits. Discover . . .

- If your grinding can be done more economically
- If your finishing is as efficient as possible
- If your polishing can be done faster and better

Send today for a free COST CHECK 5-4-5 Review Form *without obligation.* Put 3M's years of abrasive know-how at your disposal.

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COST CHECK 5-4-5

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CITY_____ STATE_____

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

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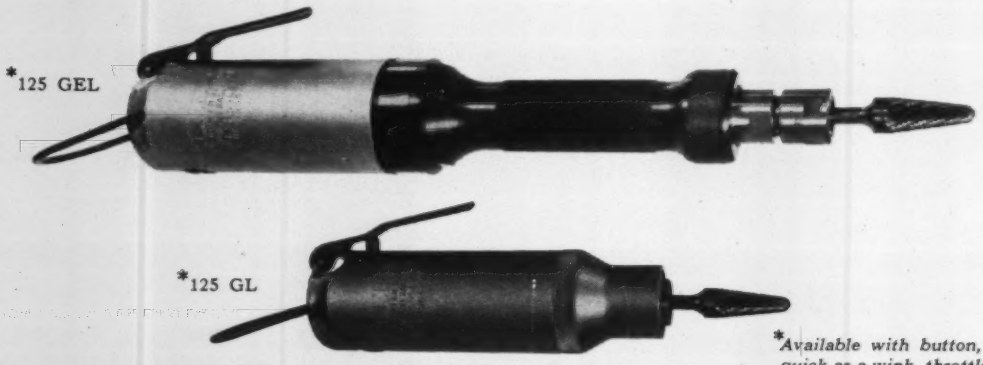
125 DIE GRINDER

Especially designed as a heavy duty die grinder for use with 3/8" shank carbide burs



**Available with button, lever and quick-as-a-wink throttle.*

The Cleco 125 (23,000 RPM) Die Grinder is a *new* development in metal removing, using heavy duty carbide burs and mounted points. It features what you have asked for in heavy duty die grinding—lighter weight, greater horsepower, more speed, no vibration.

Excellent for hand routing operations and fast metal removal with 3/8" or 1/4" shank carbide burs, the Cleco 125 Die Grinder extends the use of carbide burs into new fields.

Standard on all models is a metering valve that allows the operator to reduce the RPM for non-ferrous applications, such as cleaning aluminum castings. The metering features of the 125 Die Grinder coupled with high motor horsepower make it adaptable to ferrous and non-ferrous work.

For complete information on the Cleco heavy duty 125 Die Grinder, call or write—

CLECO
AIR TOOLS

"quality tools engineered for industrial progress"

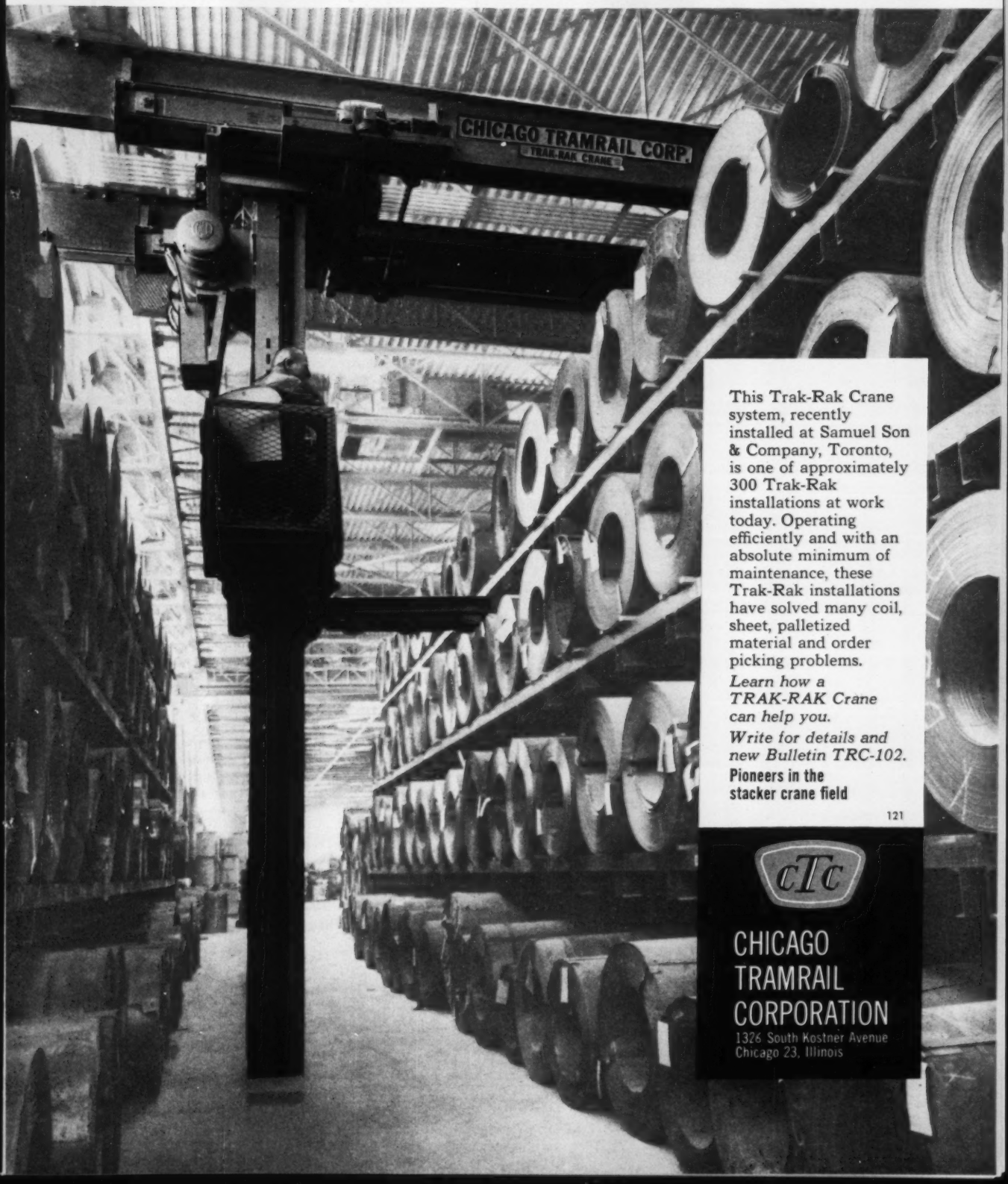
A Division of Reed Roller Bit Company P. O. Box 2541, Houston 1, Texas, U.S.A.

IN CANADA: Cleco Pneumatic Tool Company of Canada, Ltd., 927 Millwood Road, Leaside (Toronto) Canada

Handling Coil with a TRAK-RAK CRANE

can bring you:

1. Up to 4 times greater storage capacity in the same area.
2. Manpower savings up to 70%.
3. 100% selectivity.
4. Increased handling speed and safety.
5. Overall reduction in warehousing costs.



This Trak-Rak Crane system, recently installed at Samuel Son & Company, Toronto, is one of approximately 300 Trak-Rak installations at work today. Operating efficiently and with an absolute minimum of maintenance, these Trak-Rak installations have solved many coil, sheet, palletized material and order picking problems.

Learn how a TRAK-RAK Crane can help you.

Write for details and new Bulletin TRC-102.

Pioneers in the stacker crane field

121

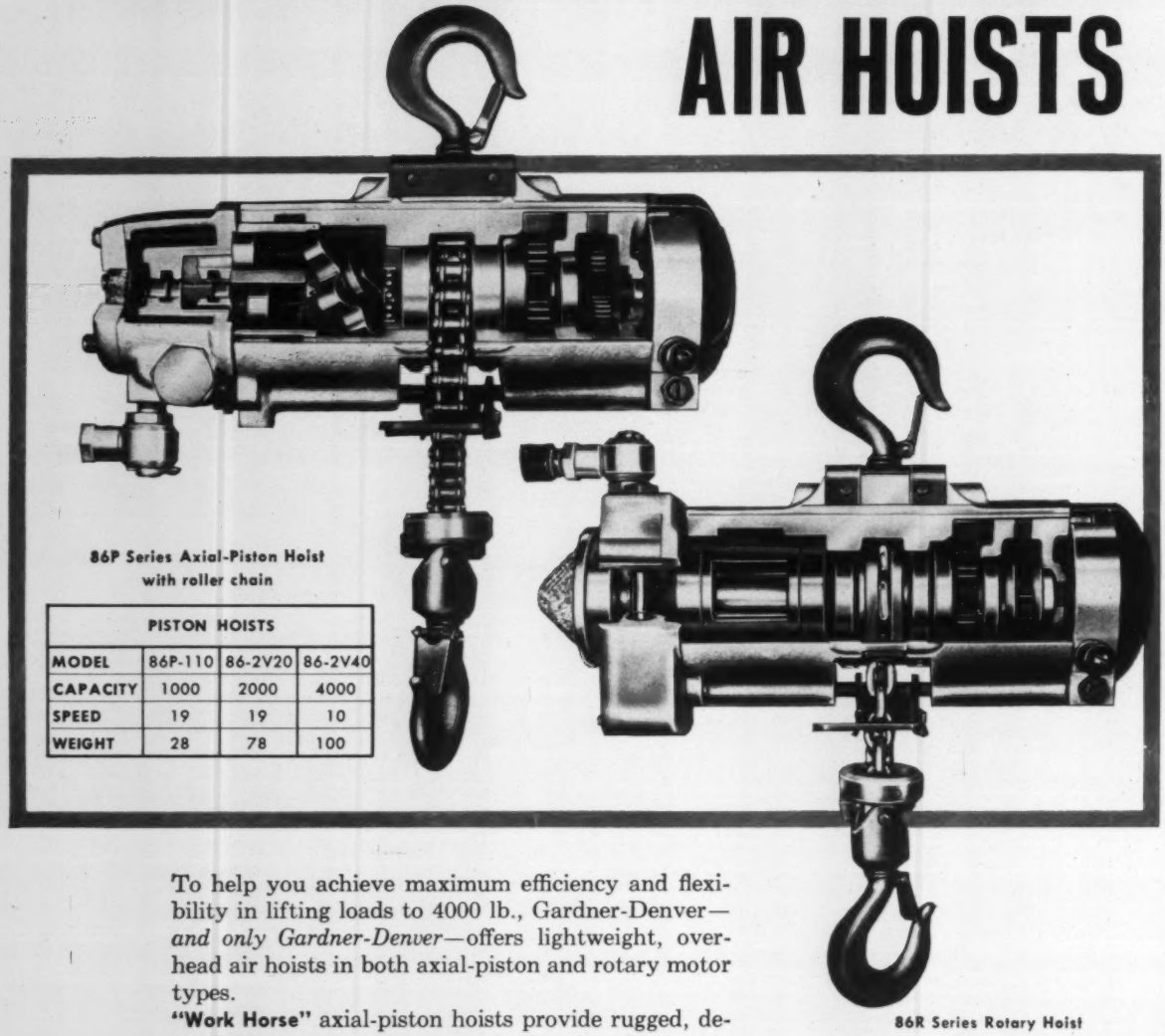
CTC

CHICAGO TRAMRAIL CORPORATION

1326 South Kostner Avenue
Chicago 23, Illinois

to lighten your lifting cost load...

"WORK HORSE" or "RACE HORSE" AIR HOISTS



86P Series Axial-Piston Hoist with roller chain

PISTON HOISTS			
MODEL	86P-110	86-2V20	86-2V40
CAPACITY	1000	2000	4000
SPEED	19	19	10
WEIGHT	28	78	100

To help you achieve maximum efficiency and flexibility in lifting loads to 4000 lb., Gardner-Denver—*and only Gardner-Denver*—offers lightweight, overhead air hoists in both axial-piston and rotary motor types.

"Work Horse" axial-piston hoists provide rugged, dependable operation where load *control* is the important factor.

"Race Horse" rotary air hoists are designed for use where the combination of speed and ruggedness is the major consideration.

Both types provide variable speed, spark-resistant operation, powerful brake and precise control. Popular models available from 150- to 4000-lb. capacity.

86R Series Rotary Hoist with link chain

ROTARY HOISTS			
MODEL	86R-5	86R-10	86R-20
CAPACITY	500	1000	2000
SPEED	90	40	20
WEIGHT	27	27	30

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER - DENVER

Gardner-Denver Company, Quincy, Ill.—Offices in principal U.S., Canadian and Mexican cities.
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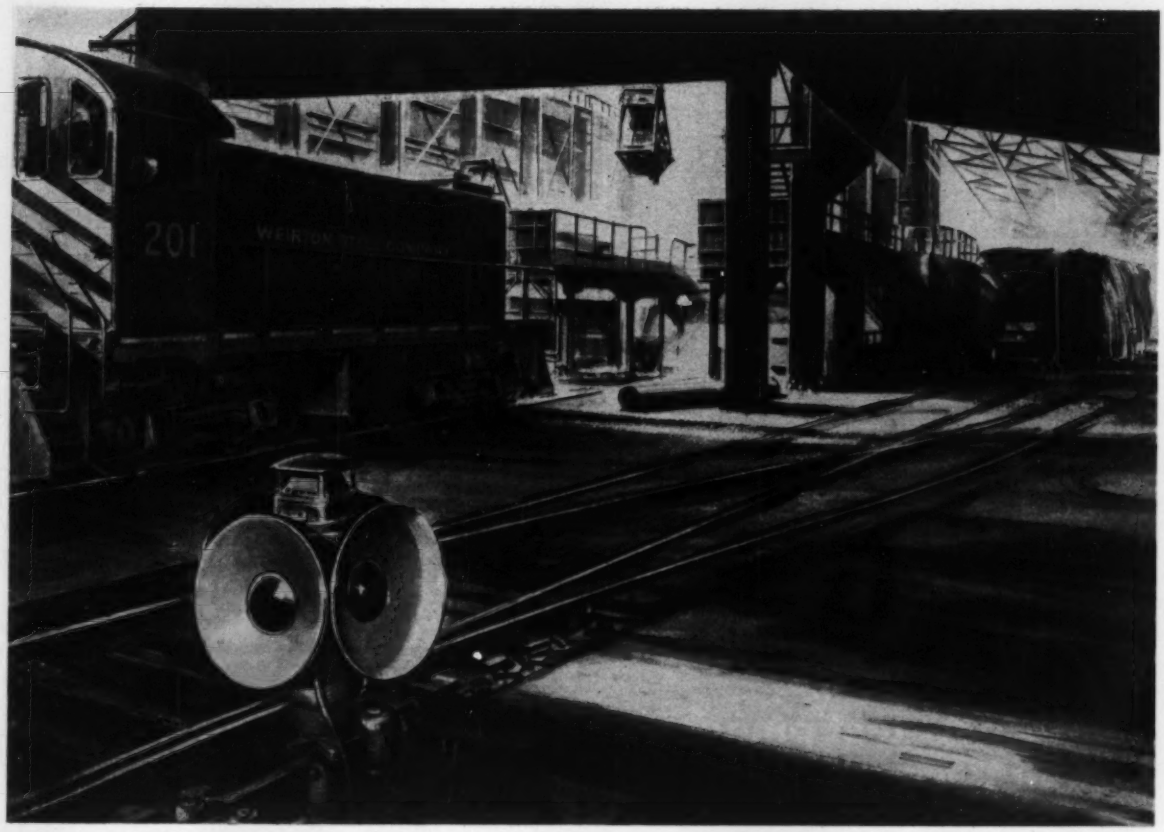


Battery operated switch lamps cut maintenance costs at Weirton Steel Company

In 1956, Weirton Steel Company, Division of National Steel Corporation, converted 275 switch lamps from oil to battery operation on roughly 47 miles of track. Previous to this change-over, hardly a night passed when at least one oil lamp wasn't reported out. This has not been the case since conversion to battery-operated switch lamps. Added to this increased reliability is the considerable savings realized in the reduction of high maintenance costs. For details on battery conversion costs and savings, write National Carbon Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. In Canada, Union Carbide Canada Limited, Toronto.

USE "EVEREADY" CG-212 BATTERIES WHEN YOU CONVERT TO ELECTRIC SWITCH LAMPS

Compare these advantages:

Switch lamps powered by "Eveready" batteries cost less than $20* a year to maintain, whereas oil-lighted switch lamps cost $50 or more.

Maintenance savings alone pay for the change-over in roughly 24 months.

These batteries provide a uniform, reliable light.

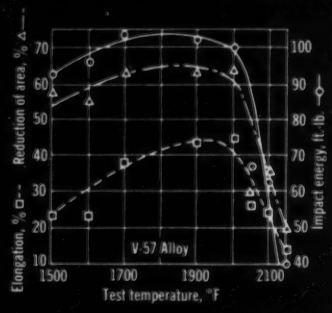
With "Eveready" batteries there are no sooty deposits, no flickering flame, no foul weather failure and no handling of flammable fuel.

*A 2.9 volts; .150 amps.

"National", "Eveready" and "Union Carbide" are registered trade-marks for products of

NATIONAL CARBON COMPANY

UNION CARBIDE



Plot of tensile-impact properties indicates that the recommended hot working range of Carpenter's V-57 alloy in wrought form lies between 1700 and 2000°F.

fast, new test pinpoints best forging range for high temperature alloys

A fast, easy and economical, new Carpenter test takes much of the guesswork out of hot working high temperature alloys. The results, when correlated with other Carpenter test data and mill experience, reveal the best working temperatures—help forge shops get better finishes with less machine clean-up . . . less wasted steel . . . fewer rejects . . . faster fabricating.

Based on tensile-impact . . . Using a modified tensile-impact test method, impact strength, elongation and reduction of area in an alloy are determined over a range of temperatures. By plotting tensile-impact properties as a function of temperature, the hot working range of the alloy can quickly be established. (see chart)

New, improved Carpenter techniques and quality controls like this, are your best assurance of easy forgeability and consistent uniformity in high temperature alloys. For details, or data on Carpenter's VACUMELTROL® and CONSUMET® vacuum melted products, call your Carpenter representative today.

Carpenter steel

you can do it ***consistently*** better with Carpenter Specialty Steels for specialists

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Export Dept., Port Washington, N.Y.—"CARSTEELCO"
Alloy Tube Division, Union, N.J.
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Carpenter Steel of New England, Inc., Bridgeport, Conn.

Are you Sure your... TOOL GRINDING METHODS are TAILORED for 1961 ?

Carbide Engineers are AMAZED when they learn the FACTS about ANOCUT ELECTROLYTIC GRINDING!

THE TIMKEN ROLLER BEARING COMPANY *Reports*
7 TO 1 REDUCTION IN... DIAMOND WHEEL COSTS
4 TO 1 REDUCTION IN... GRINDING TIME

MANCHESTER MACHINE & TOOL CO. *Reports*
PRODUCTION RATE Steadily Increased
DIAMOND and LABOR COSTS Steadily Decreased

DODGE of Mishawaka, Ind. MANUFACTURING CORPORATION *Reports*
ONE machine replaces THREE
Wheel Costs Reduced $3500 per year!
Tool Cracking Eliminated!
Labor Costs Reduced 50%!

PHOTO COURTESY OF THE TIMKEN ROLLER BEARING CO.

LET ONE OF OUR ELECTROLYTIC MACHINING SPECIALISTS LOOK INTO YOUR OPERATION . . . and such **PROVED SAVINGS as these can be yours . . . for Grinding Tungsten Carbide and other Difficult-to-Machine Materials!!**

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The efficient action of a Flat Spring is dependent upon the quality of the STRIP STEEL.

WASHBURN

has over fifty years of experience in solving spring steel problems, to guarantee the quality of your product.

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WASHBURN

CLEAN, UNIFORM BILLETS - STRIP - RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

NEW SAFETY SOLVENT HAS LOW TOXICITY

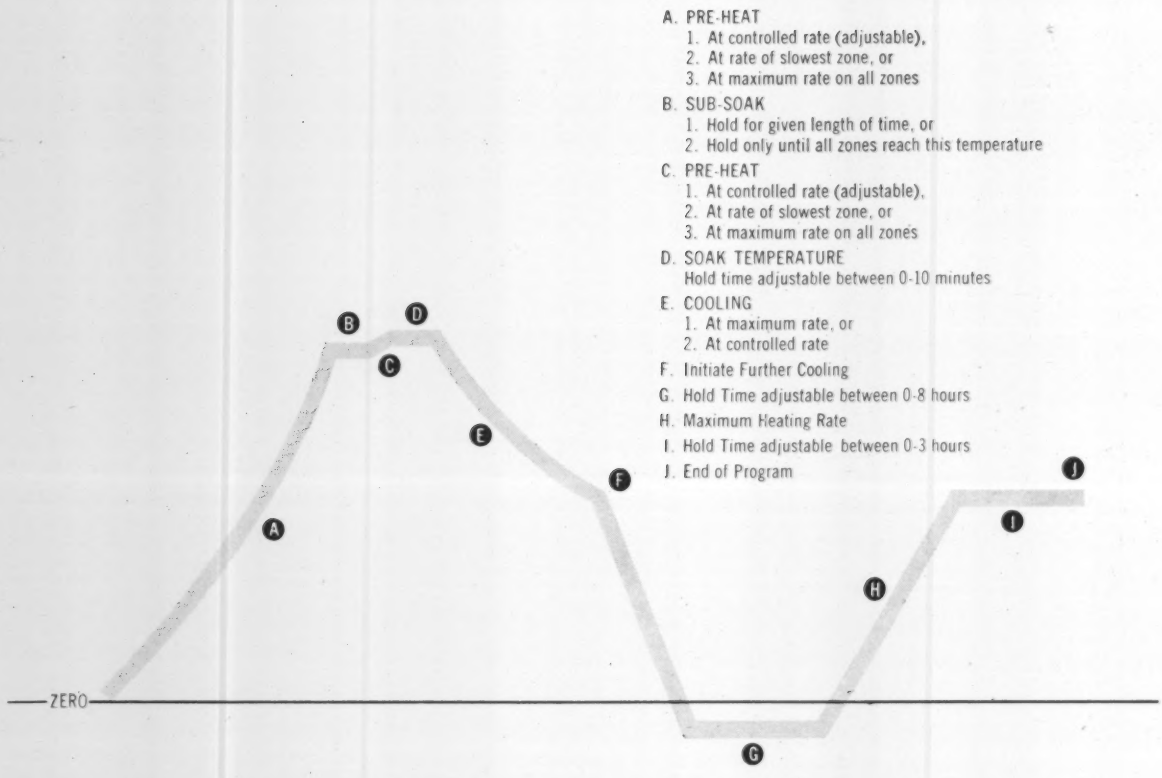
CHLOROTHENE® NU cold-degreasing solvent has all the desirable characteristics of the nonflammable chlorinated solvents *plus* less toxicity. Maximum allowable vapor concentration is a high 500 ppm compared to carbon tetrachloride at 25 ppm. Chlorothene NU shows outstanding superiority in its resistance to fire—it has *no* fire or flash point measurable by standard methods!

This combination of low toxicity and no flash point has led to the wide use of Chlorothene NU in production and maintenance cold-degreasing operations. Chlorothene NU specially inhibited 1,1,1-trichloroethane has an excellent low-corrosion record. It can be used safely on most electric motors, instruments, all common metals,—including aluminum, zinc, and corrosion-prone "white-metal" alloys, and many plastics. It is easily recovered by distillation.

Use Chlorothene NU in *your* cold degreasing. Contact your distributor of Dow solvents for complete information about its safety features, uses, recovery and cost. Ask him about Dow trichloroethylene, perchloroethylene and methylene chloride, too. Or get in touch with your nearest Dow sales office.

SEE YOUR DISTRIBUTOR OF DOW SOLVENTS FIRST!

THE DOW CHEMICAL COMPANY DOW Midland, Michigan



When temperature uniformity is a must... reproduce your heat-treating cycles with L&N's new master-slave program control

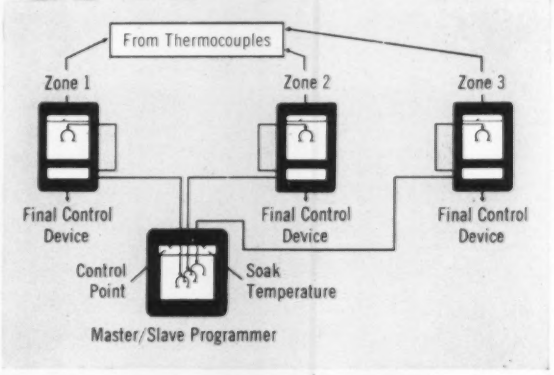
Designed for applications where temperature uniformity is of prime importance, L&N's new master-slave program control system has the flexibility to take your product—with minimum temperature gradient—through various heating and cooling cycles. It is currently being used in brazing stainless steel honeycomb panels for supersonic aircraft and missiles.

You can use this system on either batch or continuous furnaces . . . can control from either work or furnace temperatures. Heating cycles may be at a fixed rate, or at the rate determined by the slowest or fastest heating zone. As many as twenty-four zones may be automatically controlled by one master-slave programmer.

This master-slave system is available with 3-action P.A.T. control for fuel-fired furnaces; with 3-action C.A.T. control for continuous, stepless regulation of input to electric heaters or blankets; or with D.A.T. control for either electric or fuel-fired furnaces.

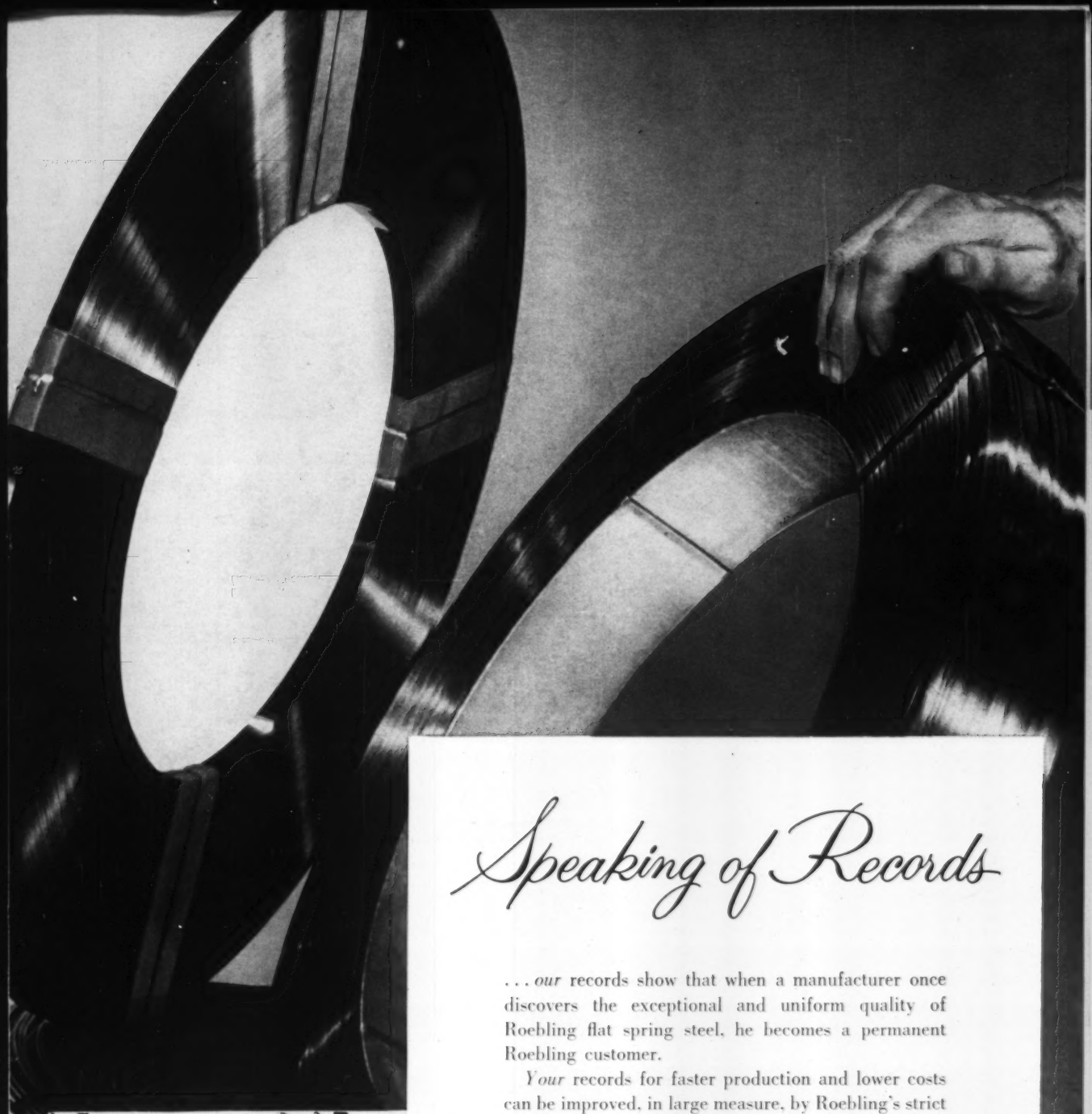
The system includes Speedomax® H controllers with appropriate couples and control devices for each zone; and a master-slave programmer for automatically and continuously adjusting control-point for each zone.

If your process can benefit from precisely controlled heating and cooling, you may be surprised to learn how large a return you can get by modernizing with this quality instrumentation. For details, call your nearest L&N office, or write us at 4957 Stenton Ave., Phila. 44, Pa. Ask for Process Data Sheet 660(2).



LEEDS NORTHRUP
Instruments Automatic Controls • Furnaces

Pioneers in Precision



Speaking of Records

. . . *our* records show that when a manufacturer once discovers the exceptional and uniform quality of Roebling flat spring steel, he becomes a permanent Roebling customer.

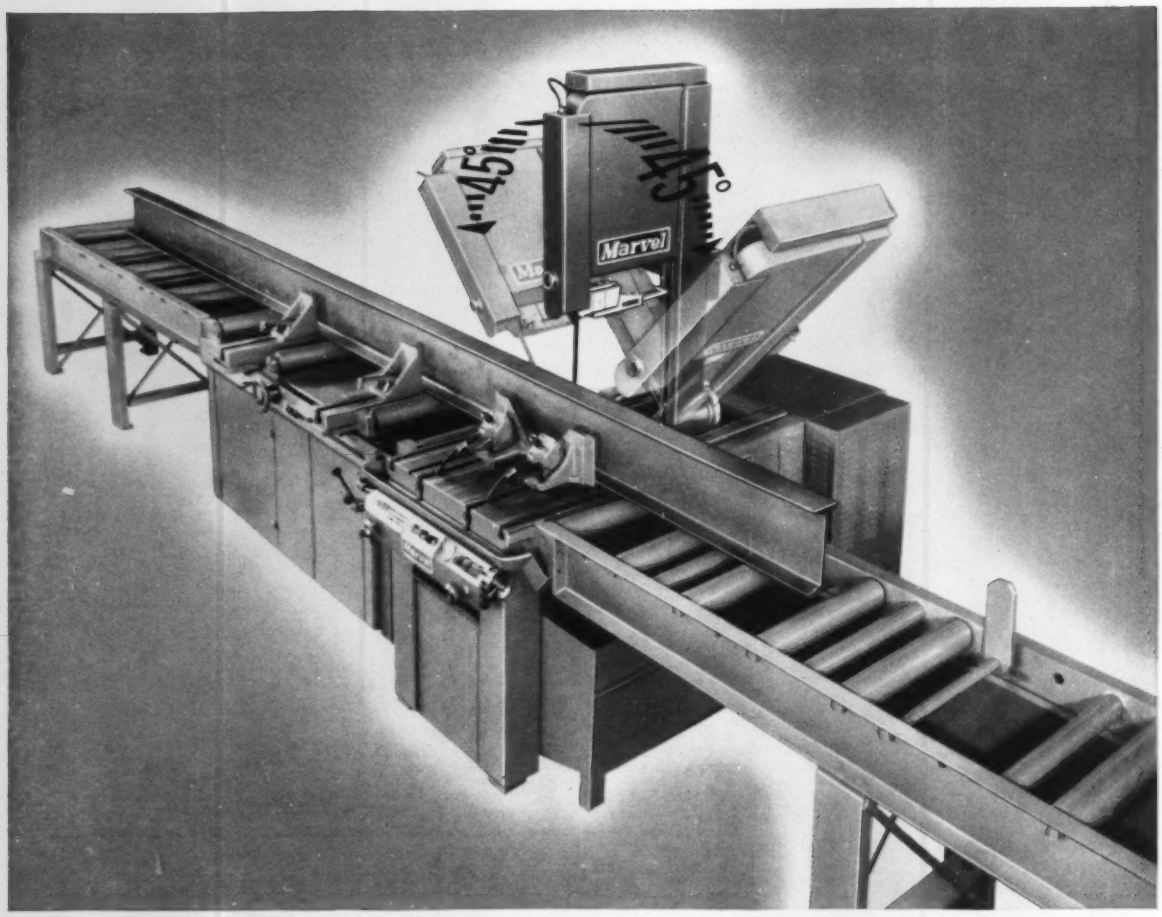
Your records for faster production and lower costs can be improved, in large measure, by Roebling's strict attention to supplying you with the finest flat spring steel available. When you need flat spring steel, specify Roebling. Write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey, for complete details.

These are typical of the many types of quality parts produced from Roebling flat spring steel.

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division • The Colorado Fuel and Iron Corporation

Roebling . . . Your Product is Better for it



Tips Its Head To Cut Production Corners

Sawing 45° miters in any kind of material has always been a simple task for MARVEL Saws, but moving the work up automatically and making consecutive cuts on an angle was a problem, especially when the work was long and cumbersome.

This triple exposure photograph of a new MARVEL No. 81A All Hydraulic Heavy Duty Automatic Bar Feed Band Saw, illustrates how the upright head or column can be tipped 45° either right or left of vertical to make angle or miter cuts. The work is held stationary while the column, which carries the blade, is fed forward, meeting the work squarely to insure accurate cutting. After the cut is completed, the work is automatically moved up and measured, and another cut made.

Automatic miter cutting is just one of many exclusive universal features of these band saws. Designed to utilize every advantage of high speed steel band blades, MARVEL No. 81 Series Band Saws can handle almost any conceivable sawing job—from the smallest, most delicate work, up to 18″ x 20″ shapes.

Only the MARVEL No. 81 Band Saws have the "SURE-LINE" Automatic Accuracy Control (basic patent applied for) which literally steers a blade to make a straight cut. This unit extends usable blade life as much as 50%.

MARVEL No. 81 Series Band Saws are proving themselves daily, as the most versatile machine tools in production metalworking plants.

For complete details, or a demonstration of MARVEL Sawing Equipment, write: Armstrong-Blum Manufacturing Co., 5700 W. Bloomingdale Ave., Chicago 39, Ill.

MARVEL *Metal Cutting* SAWS
Better Machines–Better Blades

A fresh approach to metal cleaning

Metal parts and assemblies which have undergone machining, grinding, heat treating, forging or press drawing operations usually have to be cleaned prior to the next processing step or final packaging.

A cleaning compound is selected according to the type of soil, its stubbornness and whether the surface has to be chemically clean—as required if plating or enameling are to follow.

Since the development of surface active agents it has been found unnecessary in intra-operation cleaning to use a harsh alkali. Today's metal cleaning compounds seldom contain free caustic, yet they are far more effective than the earlier materials. By combining detergents with mild alkalies there are definite advantages of easier rinsing, better soil dispersion and emulsification, plus minimum resoiling from a used bath.

Excessive heat unnecessary

Temperatures can be lower, too, hence easier on the operators. The same modern cleaner which will remove light soil at room temperature will be more effective at 120°-140°, but it need not be raised to the boiling point, with resultant fumes, steaming and discomfort.

The detergents used in these modern cleaning formulations for use in power washers are non-foaming, therefore do not interfere with maximum spray impinging force which helps dislodge adhering soil.

Rust protection built in

Another modern trend in cleaning compounds is to add a water-soluble rust preventive, to protect against early rusting by leaving a very slight film on the metal—one which does not interfere with subsequent operations. Of course, this is not possible when cleaning before plating or porcelain enameling where a chemically clean surface is required.

Determining the concentration of a cleaning bath and its rate of exhaustion is one of the puzzlers for many a metalworking plant. To be accurate, a chemical titration is more dependable than short-cut "gadgets" sometimes offered. The Houghton technical staff man uses this kit for exact measurement of the strength of a solution. Description or demonstration is available to our customers upon request.

One more improvement in today's cleaners is the property of water softening. These newer products contain sequestering or chelating agents which combine with hard water constituents, holding them in solution and preventing precipitation on the work or in the rinse tank.

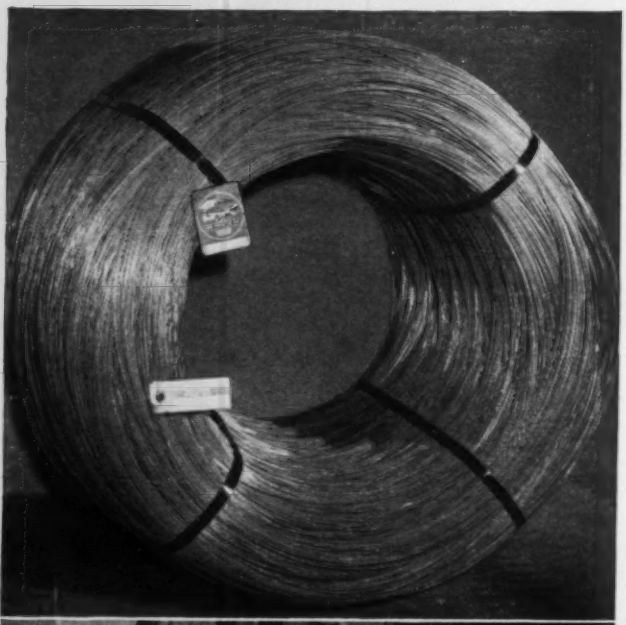
This ability of today's metal cleaners to lower surface tension, to protect against early rusting and to soften hard water has resulted in industry's taking a new look at their cleaning practices. Fewer varieties are required because a single cleaner will do a far wider range of work than could the old style free-caustic varieties.

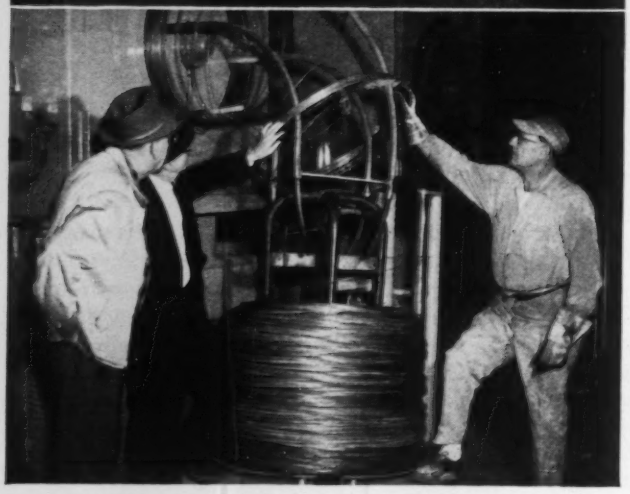
Houghton's new approach to cleaning is typified by our Cerfa-Kleen line of soak tank and power washer compounds—both for cold and hot solutions. If you need a plater's cleaner, or one for removal of inorganic soil, or an acid type, we have those too. **Write E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.**

Houghton

INDUSTRY'S PARTNER IN PRODUCTION

DSC-PORTSMOUTH "LAYER WRAPPED" LPR® COILS GIVE UPHOLSTERY SPRING MAKER OVER 40 MILES OF NON-STOP FABRICATING PER SETUP





LONG PRODUCTION RUN
SNAG-PROOF COILS
AVERAGE OVER 3200 LBS.
.076″ HIGH CARBON WIRE

Improved "Layer Wrapping" Method Steps Up Fabricating Efficiency

DSC-PORTSMOUTH DIVISION, Rod and Wire Department, is in routine production and shipment of .076″ Upholstery Spring Wire in Long-Production-Run coils averaging over 3200 pounds in weight and over 40 miles in continuous length. One of these coils is shown in the adjacent photograph.

LONG PRODUCTION RUN COILS are not new. For years we have been regularly producing LPR's weighing up to about 4200 pounds. But it is something like crashing a "New Frontier" to produce spring wire LPR's as light as .076″ in gauge and weighing over 1½ tons—*and packaged in a way that virtually eliminates the chance of snagging or tangling in your pay-off operation.*

THIS CONTRIBUTION to WIREWORKING EFFICIENCY is one important result of *"layer wrapping" the strands as the big coils are built up.* This mill operation is shown in the lower photograph.

Would cost-reducing, Long-Production-Run, snag-proof coils fit into your brite wire fabricating picture? *For the complete story on LPR's and "layer wrapping", and answers to your questions regarding application, size-weight ranges and prices, call your DSC Customer "Rep" or write: Detroit Steel Corporation, Box 7508, Detroit 9, Michigan.*

Customer Satisfaction—Our No. 1 Job

Customer "REP" Offices in Principal Cities

DSC®

Steel — The Bargain Wonder Metal

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DETROIT STEEL

Flat Rolled and Wire Products

Detroit Steel Corporation—General Sales Office, Detroit 9, Michigan
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Automation and Jobs

In the midfifties, Fred Crawford, then head of Thompson Products Inc., attracted national attention with this observation:

"Thirty-eight years ago, our company had 200 workers. Since then, we have been buying all the labor saving machinery we could lay our hands on to get rid of those 200 workers. Today, Thompson's employment is 21,000."

The telephone industry has also been consistently aggressive in its drive for greater automation. Ohio Bell reports that from 1945 to 1960, its employment jumped from 13,000 to 20,000. Its payroll leaped from $32 million to $114 million. Its telephones in service more than doubled, from 1.1 million to 2.7 million. But its prices inched up only a third as much as prices generally.

Those and other examples illustrate a basic truth: In the long run, mechanization or automation creates more and better jobs by making possible the production of more and better goods at prices more people can afford.

But another truth is equally basic: Over the short term, workers may be dislocated—temporarily and locally—by automatic machinery.

It is a problem about which too little has been done. Management generally has skirted it. Labor has used it as a bogeyman. Demagogues have used it to confuse.

We believe that the dislocation of workers by improved production machinery is a national problem. We believe it will become a bigger one in this decade as we face the dual necessity of sharpening our productive efficiency and providing 13 million to 14 million new jobs.

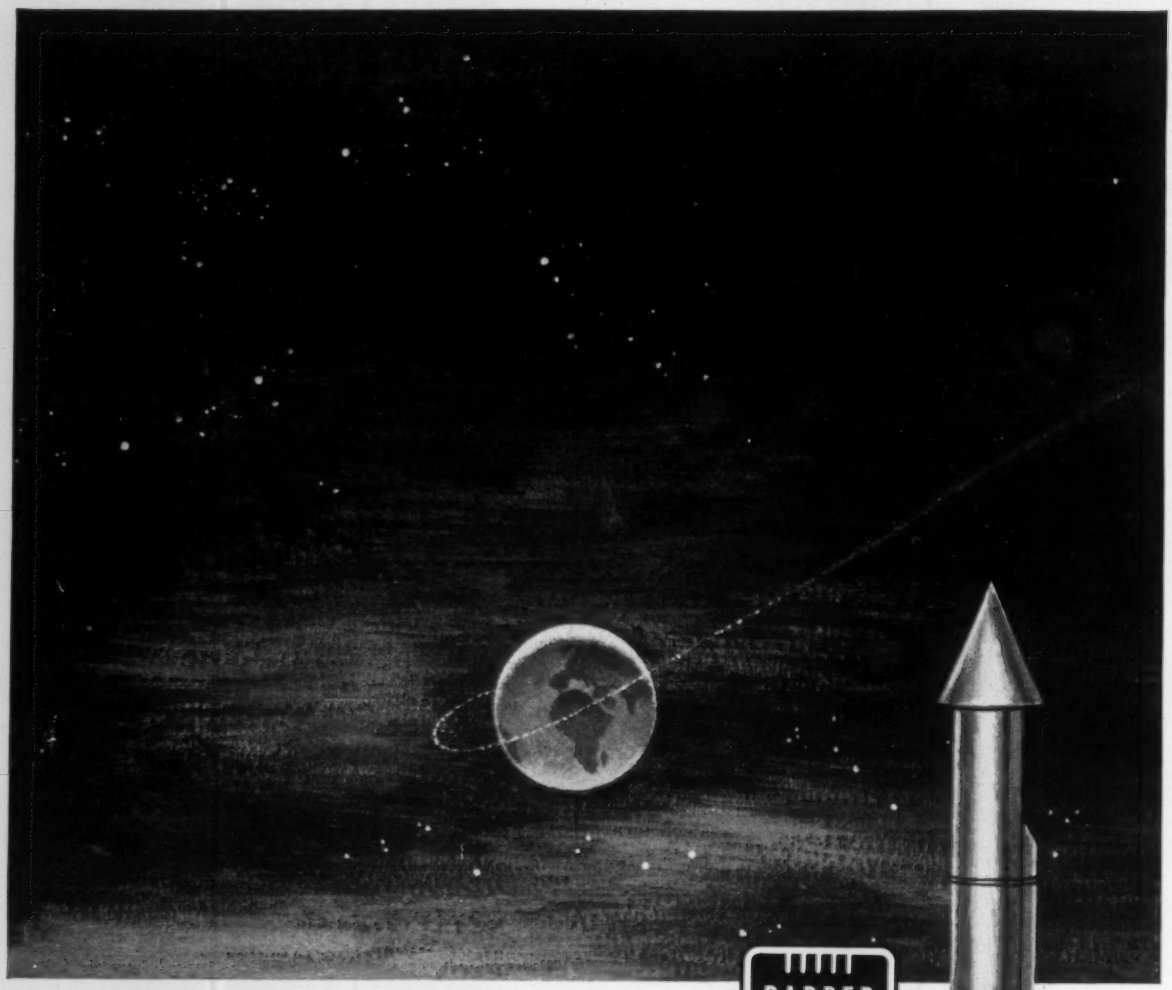
We believe the case of the dislocated workers must be attacked co-operatively by industrial management, by labor, and by government. No one of those groups can deal with it effectively.

We believe that jointly (with honest and open approaches and adequate planning) we can ease the return of dislocated workers to gainful employment—and often at improved levels. Retraining and perhaps relocation will sometimes be required.

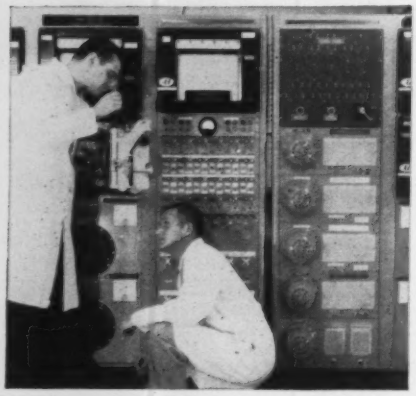
Once we solve the plight of the dislocated worker, automation can be recognized as a universal blessing. A solution would promote more and better jobs for our people, increase our national efficiency, make more and better goods and services available, and enable us to become more competitive in the new world market.

Walter J. Campbell

EDITOR



BARBER COLMAN



Atomics International, a Division of North American Aviation, Inc., designed this control system at Canoga Park, Cal. for testing nuclear fuels at the National Reactor Testing Station in Idaho. The panels monitor surface and center fuel temperatures and control a neutron absorbent for four fuel capsules simultaneously.

Industrial Instruments • Automatic Controls • Air Distribution Products • Aircraft Controls • Electrical Components

Rocket propulsion has been known for centuries.
The important difference between fireworks and
a space probe is . . . A MATTER OF CONTROL.

Process Control Systems . . .

To achieve an important difference in process control requires excellence in two areas. You must have good instruments and they must be integrated into a balanced, responsive, dependable system. Famed Barber-Colman industrial process control instruments engineered by trained field engineers assure excellence. Twenty-five years of process control application experience assures it, too. Call on Barber-Colman to insure the difference is in your favor.

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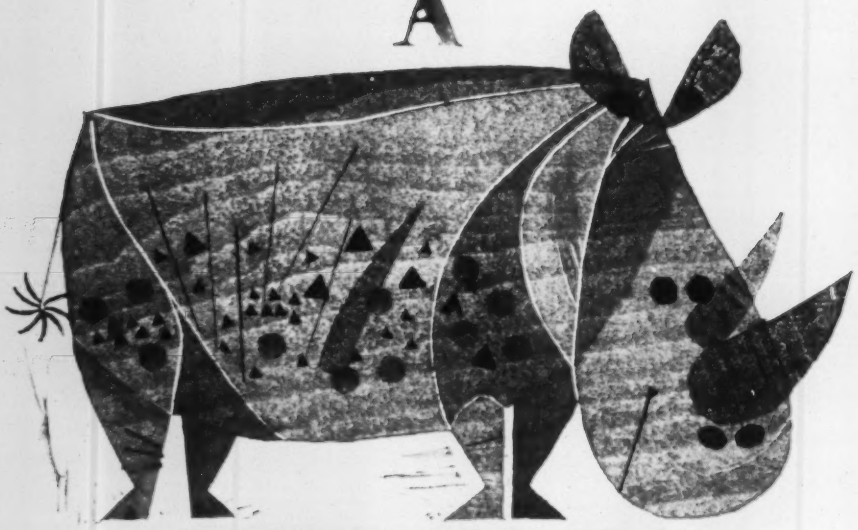
Wheelco Industrial Instruments Division

Small Motors • OVERdoors and Operators • Molded Products • Metal Cutting Tools • Machine Tools • Textile Machinery

WHAT HIDE IS TO A



TI-CO®

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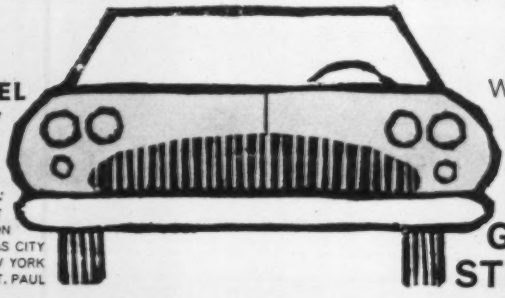

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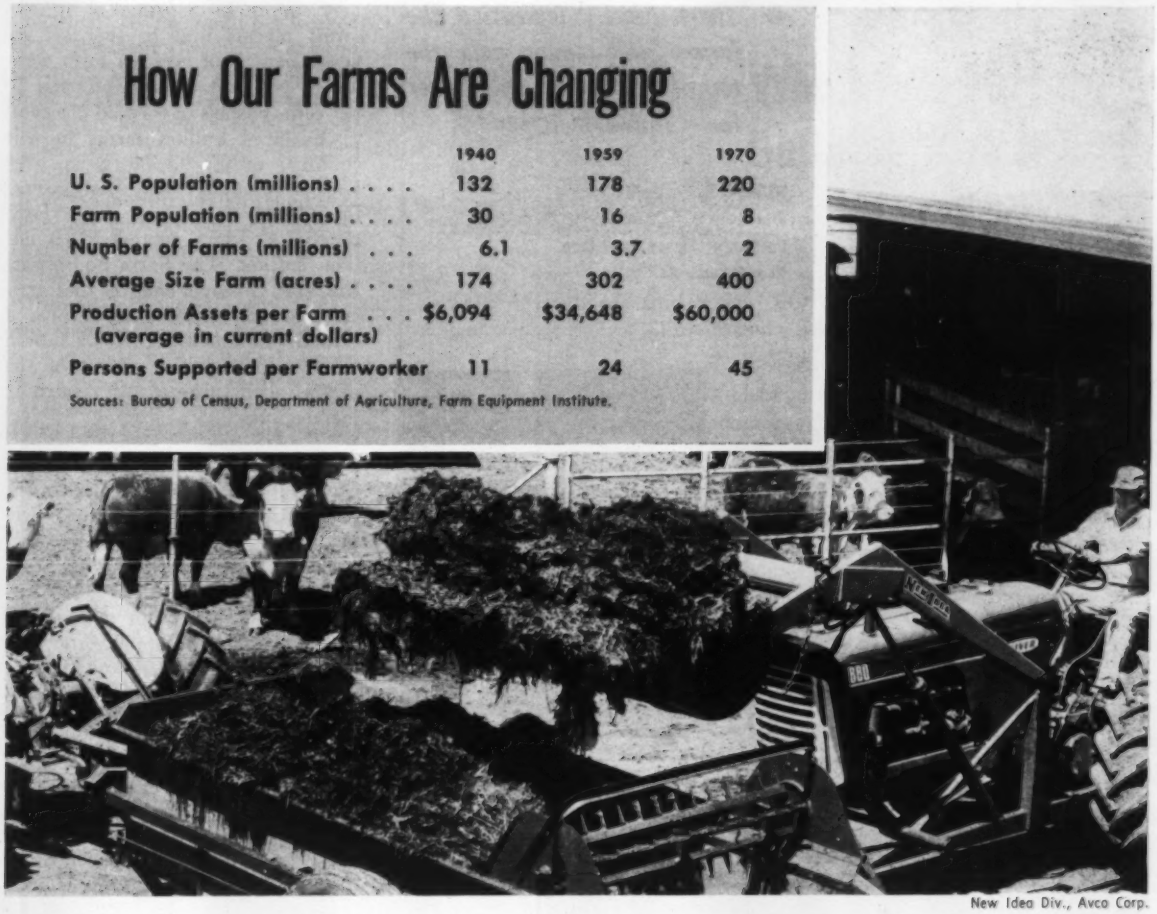
wherever **protection** against corrosion is required, use: **INLAND TI-CO® GALVANIZED STEEL SHEETS**

How Our Farms Are Changing

	1940	1959	1970
U. S. Population (millions)	132	178	220
Farm Population (millions)	30	16	8
Number of Farms (millions)	6.1	3.7	2
Average Size Farm (acres)	174	302	400
Production Assets per Farm (average in current dollars)	$6,094	$34,648	$60,000
Persons Supported per Farmworker	11	24	45

Sources: Bureau of Census, Department of Agriculture, Farm Equipment Institute.



New Idea Div., Avco Corp.

Fewer farms, but larger, more mechanized 'agribusiness' units make . . .

Modern Farms: Marketing Challenge

IN NEW HAMPSHIRE, a Ph. D. waits for some test results to go through an electronic data processing machine. In Arkansas, a manager sends an employee off in a company plane in response to a customer's request for a troubleshooter. In Georgia, an owner O.K.'s an order for $150,000 worth of equipment. What do these men have in common? They're chicken breeders.

Those incidents are part of the revolution in agriculture that is changing the face of our farms. For metalworkers, the factoryization of the farm is a tremendous market opportunity.

It's true that we've lost 1.5 million farming units in the last ten years . . . that we may well lose another 1.5 million in the next ten years . . . that our farm population accounted for 23 per cent of our total population in 1940 . . . that today it's less than 10 per cent . . . that by 1975 less than 4 per cent of the population may be classified as farmers . . . that agricultural income as a percentage of gross national product is declining.

Alert manufacturers realize that a surface analysis of those figures doesn't tell the whole story. Look behind the cold statistics:

Fewer, but Larger Farms

While the number of commercial farms in the U. S. dropped 27 per cent between 1954 and 1959, the number with a gross annual income of $10,000 or more increased 36 per cent. Experts agree the trend will continue. In fact, some sources estimate that as few as a million

● *"There's every indication the farmer will remain near the top of the list as a customer for metalworking goods"*

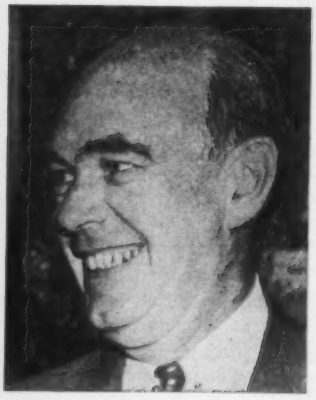
GEORGE C. DELP, President
New Holland Machine Co.
Division of Sperry Rand Corp.
New Holland, Pa.

● *"Metalworkers will have to keep abreast of the farmer's requirements to hold this market"*

L. W. DAVIS,
General Manager, Farm Equipment Div.
Vice President, Allis-Chalmers Mfg. Co.
Milwaukee

● *"Continued farm mechanization will create a need for equipment we can't even visualize now"*

WM. J. GREDE, President
J. I. Case Co.
Racine, Wis.



● *"Too few manufacturers are applying the systems engineering concept to farm machinery design"*

CURRY W. STOUP, President
New Idea Div., Avco Corp.
Coldwater, Ohio

farms will be needed to feed and clothe the U. S. in 1970.

A survey of a group of Illinois farms reveals that in the last six years, pounds of beef per farm went up 94 per cent, pounds of pork 34 per cent, bushels of corn 28 per cent.

Of the 4 million farms in this country, only 700,000 gross over $10,000 annually. But they account for 74 per cent of all major farm purchases, which totaled $16.9 billion in 1959. The Farm Equipment Institute, Chicago, believes that agriculture will continue to furnish a capital goods market of $3.5 billion to $5 billion a year. Most of the capital goods are directly related to metalworking.

● **Agriculture's Role** — Dr. George Mehren, University of California, Davis, Calif., emphasizes that two-thirds of the value of U. S. raw materials is represented by farm products. About one-fifth of U. S. export trade is based on agricultural products. Farm buildings, land, and equipment represent about 10 per cent of this nation's capital assets. Between one-fifth and one-fourth of U. S. disposable income is spent on food and fibers.

Farm production in 1960 is estimated at $37.7 billion, over 7 per cent of our gross national product. Net income last year equaled $12 billion, up $200 million from 1959's.

More Mechanization

Improved technology has enabled farmers to raise output per manhour 80 per cent since 1940 and output per farm 74 per cent. The use of power and machinery increased 2.5 times between 1940 and 1960, reports the Department of Commerce.

One dairyman can milk 50 cows and produce 500,000 lb of milk a year. Two hundred steers can be fed in 15 minutes. A hog raiser has no problem caring for 1000 animals annually. A broiler grower turns out 160,000 birds each year. An egg producer can handle 10,000 birds with relative ease. The grain grower has increased his efficiency 300 per cent in the last 15 years. Fruit and vegetable farmers are making equally startling gains.

● **Capital Requirements Rise**—The Farm Equipment Institute points

out that the reduction in the number of farms is being accompanied by a substantial increase in the capital investment per farm and per worker. The investment (in current dollars) rose from $3413 per worker in 1940 to $21,303 in 1960—the totals include land, machinery, and livestock.

Increased automation of field equipment, feed handling and other material handling, milking and milk handling, and the like are creating markets for many new types of equipment.

Example: James Mfg. Co., a division of Rockwood & Co., Ft. Atkinson, Wis., is having much success with a pre-engineered poultry house for laying hens. It features automated feeding, watering, egg gathering, manure collecting, climate control, and a refrigerated eggroom.

• **Progress Multiplies Needs**—Automation in one area frequently opens additional sales opportunities in other areas. The development of the corn harvester, which does the shelling in the field, boosted the farmer's output from 80 - 100 bushels of shelled corn a day to 3000-6000. Since the shelled corn coming directly from the field is too high in moisture to store without processing, the purchase of field shelling equipment necessitates a grain dryer and material handling equipment to move the grain efficiently from the harvester through the dryer and into special storage bins. Thus the $4000 harvester stepped up output per man, but it required an investment of double or triple the value of the machine to make it fully effective.

• **Potential Seems Unlimited**—Areas of agriculture which are turning to mechanization to boost productivity and cut labor costs seem unlimited. Another factor: In some cases, organized labor is casting an envious eye toward farm labor.

Tom Sunderland, manager, Northern Ohio Sugar Co., Fremont, Ohio, says his firm will be out of the migrant labor market within three to four years. By then, mechanical tomato harvesters will replace the 11,000 migrant workers who picked the state's tomato crop last year. Mr. Sunderland's sugar beet harvesting is completely mechanized.

• **Even Grapes!** — Shaking devices are cutting fruit picking costs. Potato harvesting is done by machine. Even asparagus and grape pickers are about ready for popular use, reports R. R. Parks, agricultural extension engineer, University of California Extension Service.

Pneumatic pruning shears and portable hydraulic hoists on fork lifts halve the time (to 150 man-hours) needed to produce a 10 ton crop of cling peaches.

In the handling stage, automatic egg washing, grading, weighing, and packing have been common for several years. An electronic device which replaces 40 men now sorts lemons into four color classifications, handling three dozen a second or 600 field boxes an hour.

• **Progress Means Change**—Multiple tilling (several processes such as planting, cultivating, and fertilizing may be done in one pass) is creating a need for new types of equipment and making others obsolete. An Eastern firm which gets one-third of its sales from standard tilling attachments, thinks the development may plow under some of its markets. It's answer: New products.

In this rapidly changing field, "we're going to have to fight like hell to keep pace and maintain our share of the market," stresses an equipment manufacturer.

• **Systems Engineering Needed**—"Industry is frequently too slow to keep up with the technological ad-

Who Is the Modern Business Farmer?

THE AMERICAN Iron & Steel Institute calls the successful modern farmer a jack of all trades and a master of all.

He must be enough of an engineer to run $30,000 worth of machinery . . . enough of a blacksmith to fix a breakdown on the spot . . . enough of an economist to know when to buy feeder cattle . . . enough of a bookkeeper to spot weak points in his operation.

He is both a capitalist and a day laborer. He must have the brains to make 40 decisions daily . . . enough brawn to toss around bags of fertilizer (until that chore too is automated) . . . enough self-confidence to walk into the bank and ask for a five figure loan.

He must also have some knowledge of chemistry, agronomy, and the veterinarian's skill.

His wife has all the modern conveniences of her city sister and the knowledge and confidence to assist her husband in the operation of the farm.

His kids are as fad conscious as their city counterparts, drive sports cars, and go to college.

This is a rapidly changing market which looks to metalworking to supply it with the tools, machinery, and engineering with which to do a businesslike job.

vancements of the farm field, and the necessary equipment just isn't available," laments one farm expert. He cites several examples where farmers designed their own automated systems, bought the components, then put them together. Similar units were not available commercially.

Curry W. Stoup, president, New Idea Div., Avco Corp., Coldwater, Ohio, says equipment with higher capacity and greater productivity potential has the brighest future. Flexibility of machinery is also important.

Samuel W. White Jr., president, Oliver Corp., Chicago, underlines the need for much easier maintenance and less downtime. He sees farm machinery being made to closer tolerances, utilizing more hydraulics, and field equipment offering more comfort conveniences, such as power steering, better seats, improved transmissions and brakes.

Allis-Chalmers Mfg. Co., Milwaukee, has introduced a new line of tractors which features a shuttle clutch. It permits shifting from forward or reverse without stopping.

"There's a definite trend to deisel power in tractors and self-propelled equipment," comments Wm. J. Grede, president, J. I. Case Co., Racine, Wis.

The market for metal farm buildings is booming. When automating, the farmer must frequently rebuild his facilities around the new system since his old buildings are usually designed for antiquated practices.

• **Broad Opportunities**—The field is not limited to standard types of farm equipment. The new farm market offers good potential for electrical goods, welding and shop equipment, fencing, trucks, and a multitude of other items.

Increased automation and new kinds of equipment are presenting opportunities for component makers such as Link-Belt Co., Chicago, which supplies link belts, pintle and roller chain, cut tooth sprocket wheels, self-aligning bearings, and augers to the farm market.

• **Materials Fight** — Aluminum is making great strides in the farm building sector. But steel still accounts for 98 per cent of all metals consumed in farm equipment manufacture. And in some cases, it's winning new ground in the materials battle. New Holland Machine Co., a division of Sperry Rand Corp., New Holland, Pa., has introduced a self-unloading forage wagon and a large capacity manure spreader which feature steel instead of wood sides.

Industry observers see more high strength, low alloy steel used at stress points. During the fifties, farming consumed 13 million tons of finished steel in shipments made direct from the mills. In addition, a substantial amount was supplied by warehouses and retailers.

Specialization

The mechanization of the farm is leading to specialization. Ray Hurley, chief of the agricultural census, reports a sample from 33 states reveals:

Thirty years ago, more than 2 million farms were growing Irish potatoes. By 1959, the number had dropped to 363,000; and 15,000, or 4 per cent, were growing 85 per cent of the crop.

Thirty years ago, 384,000 farmers were raising turkeys. In 1959, only 36,000 were in the business, and 2500 were producing 85 per cent of the birds.

More than 2 million farms grew apples 30 years ago. The figure is down to less than 200,000 farms.

• **"Agribusiness"**—As he specializes, the farmer becomes more of an "agribusinessman." The pencil is becoming a highly respected piece of farm equipment. And with the stress on the businessman's approach, two practices are coming to the fore:

• *Contract Farming*: The farmer contracts with a processor or distributor to grow a certain acreage of farm products, or certain number of animals, for a stated price, and frequently in a stated manner. The canning industry has operated that way for years.

Tyrus R. Timm, head, department of agricultural economics and sociology, Texas A&M College, College Station, Tex., predicts most farm products will be sold this way or under government marketing agreements by 1970.

• *Vertical Integration*: Two or more independent enterprises normally involved in the production and marketing of agricultural products are combined under a single management. Broiler production is a shining example of this type of operation.

• **'61 Outlook**—After falling to the lowest level in four years during 1960, sales of farm implements began an early recovery this year. With rural incomes rising and inventories at low levels, farm equipment makers see '61 topping '60 in total sales of all types of farm equipment.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Aluminum Works at 900° F

HEAT given off by the fission process in an atomic reactor is used to make steam. The hotter the steam, the more efficient the power output.

These tubes, which contain the fuel element in the heart of the reactor, are fabricated by Aluminum Co. of America from its APM (aluminum powder metallurgy) alloys, using the impact extrusion technique. Their high temperature strength and high thermal conductivity permit the production of steam in the 900° F heat ranges, 100 to 200° F higher than with tubes of conventional alloys.

Construction Hugs '60 Spending Rate

SPENDING for new construction in March matched that of March, 1960, indicate preliminary estimates of the Bureau of the Census. The $3.9 billion worth of new construction put into place last month was 8 per cent above the February figure, which is about the normal seasonal change between the two months.

Public construction exceeded the February level by 10 per cent. Expenditures for nonresidential buildings and highways have been leading a pickup in public construction, topping year ago spending by 18 per cent. In the first quarter of this year, public construction totaled $3.2 billion vs. $2.8 billion for the corresponding period in 1960.

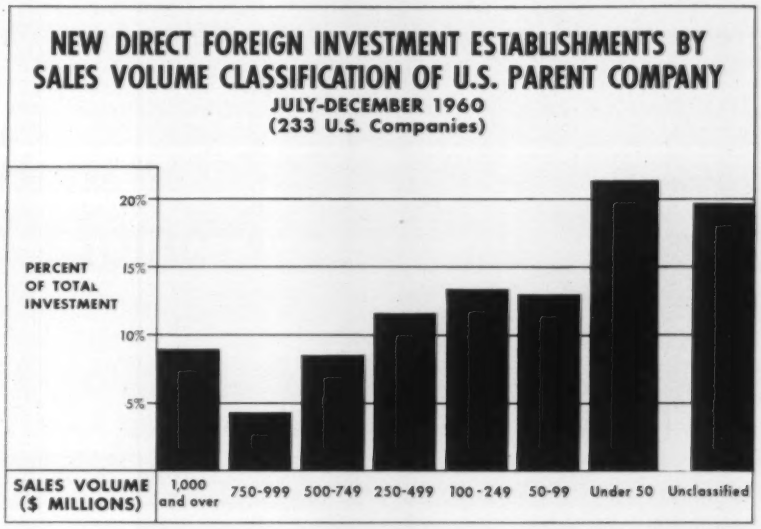
Private construction fell 5 per cent short of the $8.4 billion total in the first three months of 1960. Some gain was made in March, however, when private spending jumped 7 per cent from February.

Automaker Stresses Need For Two Way Foreign Trade

"INCREASING private investment abroad and adopting world-wide sourcing of tools, parts, and raw materials are programs that must be accomplished to meet foreign competition," Henry Ford II, president, Ford Motor Co., said last week.

In addition to stressing the need for all firms to investigate possible ways of increasing exports, Mr. Ford pointed out: In many instances a low cost imported part or component may make it economically feasible to produce or assemble a complete product here that otherwise would have to be produced abroad, or not at all.

Ford has been active overseas. Last year, it negotiated for controlling interest in Ford Motor Co. Ltd. (England), affiliate. It has purchased more than $1 million worth of parts for its Falcon from England and has been seeking quotes on parts and materials from other foreign sources. Sales of Ford cars overseas hit 662,000 last year.



Small Firms Expand Abroad

YOU DON'T have to be an industrial giant to take the big step into a foreign operation.

About 1 in 4 of the operations launched abroad by U. S. firms during 1960's last half were set up by companies with annual sales of less than $50 million (see chart above). That's the finding of a survey by Booz, Allen & Hamilton, consulting firm.

The study analyzed 316 new overseas operations by 233 U. S. firms. The findings:

• **Who Went**—Chemical firms established 19 per cent of the foreign units; nonelectrical machinery makers—15 per cent; food firms—11 per cent; financial and service organizations—8 per cent; electrical machinery makers—8 per cent; transportation equipment builders—7 per cent; fabricated metal product companies—6 per cent; primary metal producers—4 per cent; wholesale and retail trade firms—4 per cent.

• **Where They Went** — Western Europe got 56 per cent of the new operations (31 per cent in the Common Market and 24 per cent in the Outer Seven). Latin America attracted 21 per cent of the new units, followed by Asia (11 per cent), Canada (6 per cent), Oceania (3 per cent), and Africa (2 per cent). Switzerland, with its favorable tax laws, garnered 11 per cent of the new overseas units. Other favored nations: England (10 per cent), France (9 per cent), Italy, Canada, West Germany, Netherlands, and Mexico (6 per cent each), and Japan (5 per cent).

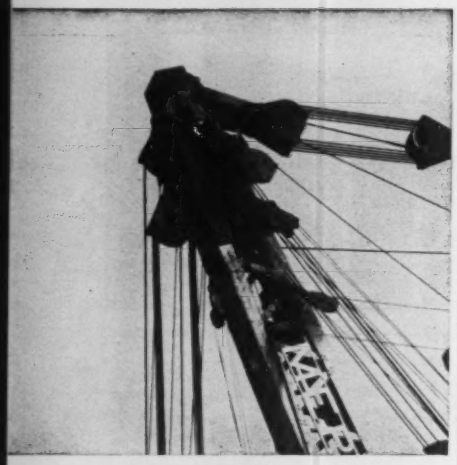
• **How They Went**—The two most widely used methods of getting into the foreign market were: 1. A joint venture with another firm, often a foreign company. 2. The formation of a wholly owned subsidiary or branch of the U. S. company.

Air Conditioning Boosts Productivity, Says GSA

A GENERAL Services Administration study finds air conditioning will pay for itself if it boosts worker output 1.5 per cent during hot weather. GSA found that output actually rose 9.5 per cent. The government also reports a 25 per cent drop in absenteeism after air conditioning was installed in 75 plants studied. A utility company reports a 50 per cent increase in drafting room output, and a watch manufacturer reports a 25 per cent drop in reworked parts.

Traffic through St. Lawrence gateway hasn't met early projections, so . . .

Lake Ports Step Up Drive To Promote Seaway Trade

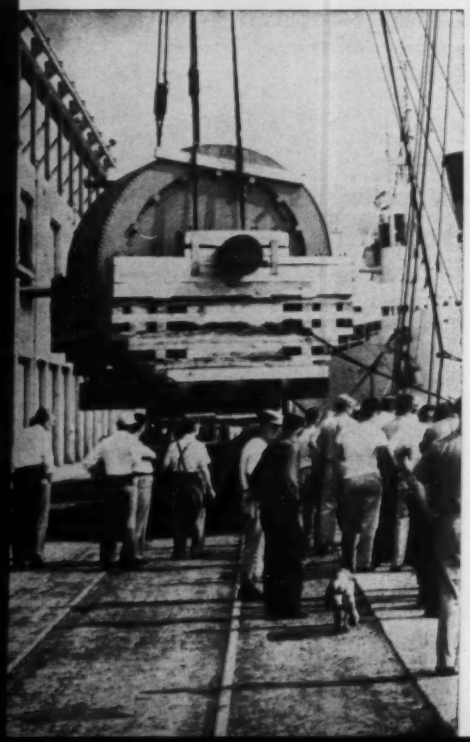


St. Lawrence River Traffic

(In cargo tons, 2000 lb)

	1960	1959
U. S. Imports	901,909	1,052,650
U. S. Exports	3,917,351	2,759,392
GRAND TOTALS		
Upbound	8,781,621	10,867,941
Downbound	11,528,725	9,483,770

Note: U. S. imports and exports do not include trade with Canada. Grand total includes all traffic going through the Montreal-Lake Ontario section of the Seaway.



THE ST. LAWRENCE SEAWAY opens its third year of operation this week. And the big ditch's enthusiasts are still looking for the reasons why Seaway activity hasn't met their earlier expectations.

Many feel that exporters are not using the Seaway to its full advantage, even though U. S. exports last year topped 1959's. Says Henry N. Holdren Jr., Cleveland's port commissioner:

"There's been a definite lack of Seaway promotion, particularly at the executive level of most firms. About 85 per cent of the exports from Cleveland and its hinterland still go through Eastern ports.

"Unlike our foreign competitors, many U. S. firms still quote f.o.b. prices and are indifferent to how their goods are shipped. It's costing them a lot of dollars in export trade," laments Mr. Holdren.

• **Imports Dip**—Shipments to the U. S. from foreign lands via the waterway fell last year from the 1959 level. The three week longshoremen's strike, and the uncertainty preceding it, diverted an unknown quantity of goods to the Eastern Seaboard. The strike had the greatest effect on nipping import volume, for outgoing goods could be more readily stored for the duration. Then too, the low level of steel activity reduced iron ore tonnage coming from Labrador.

• **Projections Too High?** — H. C. Brockel, municipal port director, Milwaukee, is enthusiastic about the prospects for 1961 and observes: "Considering the seasonal impediment and the depressed nature of our economy, we believe the Seaway is doing quite well."

Others agree, but add that the preliminary tonnage projections may have been too high. Nevertheless, Willis H. Crosswhite, traffic and information officer, St. Lawrence Seaway Development Corporation, Massena, N. Y., claims traffic will still reach 50 million tons annually in this decade. The economics of Seaway shipping seem to back his optimism.

• **Seaway Benefits**—The Port Authority of Duluth cites a saving of $5 to $10 a ton for the Seaway over inland freight costs from Duluth to the East Coast. Willys Motors Inc., Toledo, Ohio, states it saved $153,700 last year by exporting 5229 Jeeps via the Seaway rather than through Eastern ports.

Mr. Brockel reports Line Material Industries, Milwaukee, received an order for fiber conduits from Thailand, beating out competitors from England, France, and Malaya. The company, most distant of all bidders, was able to secure the largest export order in its history because of the availability of direct steamer service from Milwaukee to Bangkok.

Charles A. Hofstetter, export manager, Ace Fastener Corp., Chicago, says his firm ships all its exports through the Seaway during the season. He reveals his foreign customers request Seaway shipping because of lower freight rates.

Most of the ports are battling hard for more business. Here's a brief rundown on the major ports' 1960 activities:

• *Buffalo*—Exports rose to 65,000 tons. Imports slipped to 38,000 tons. Scrap notched 30,000 tons of the export total.

• *Chicago*—Seen as most important port to metalworkers. Exports, ex-

cluding grain, equaled 470,097 tons last year vs. 413,561 tons in 1959. Imports, excluding grain, slid to 295,151 from 389,293 tons. Port facilities and services improved, and Chicago Harbor and Calumet River deepened to 27 ft for 1961. Officials see a pickup in traffic this year.

• *Cleveland*—Exports climbed 15,000 tons to the 81,162 mark. Imports dipped to 147,691 from 155,933 tons. Port judged to have sufficient capacity through 1965 after W. Sixth Street pier completion in 1962.

• *Detroit*—Overseas cargo climbed to 600,573 from 262,593 tons. Terminal operators say they're ready to handle 1 million tons of overseas cargo if not hampered by political bickering which has slowed the port's development.

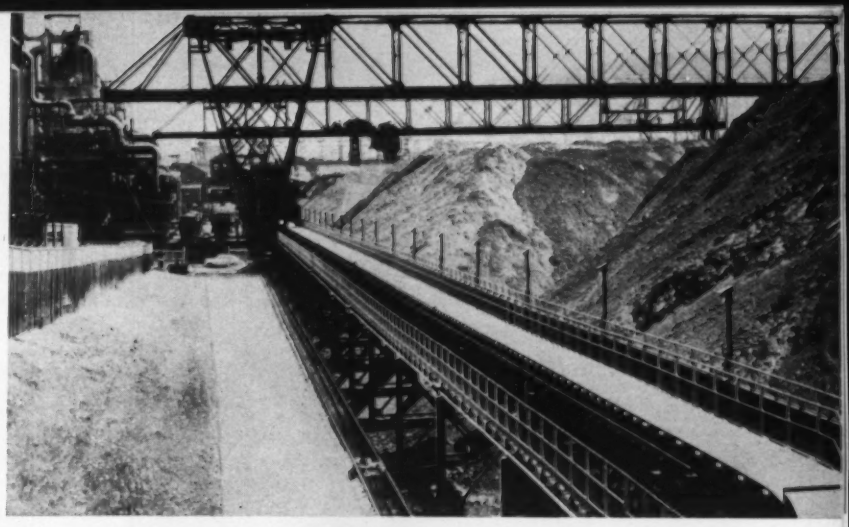
• *Duluth*—Exports, largely grains, shot to 106,500 from 22,700 tons. Imports up from 11,700 to 23,300 tons. Plans continue for a $100 million marine terminal complex.

• *Milwaukee* — Overseas cargo jumped to 230,500 from 197,000 tons. Exports totaled 200,645. Scrap exports to hit 150,000 tons in 1961 vs. 69,000 in 1960. Two new heavy duty cranes and expanded rail trackage ready for service this season. A $6 million cargo pier, warehouses, another crane and more rail facilities are to be completed this year.

• *Toledo* — Expanding, aggressive port. For the second year, sent a team of three men to Europe to drum up business. Charles Donley & Associates, Pittsburgh, has been hired to conduct traffic and rate study to aid prospective shippers. Toledo won only foreign trade zone on the Great Lakes. Overseas tonnage, not counting grain and bulk liquids, reached 114,926 tons in 1960 against 69,327 in 1959.

• *Others* — Erie, Pa.; Ashtabula, Ohio; and Saginaw River ports in Michigan appear to be gaining substantial overseas tonnage.

• **Outlook**—Most observers look for 1961 Seaway volume to increase. Two factors are creating some concern: 1. The setting of tolls on the previously free Welland Canal. 2. The prospects for a general increase in all Seaway tolls should traffic continue to fail to meet expectations.



Large stocks of iron ore in inventory mean . . .

Lake Ships Get Slow Start

THE 1961 GREAT LAKES navigation season is getting off to one of its slowest starts in years.

A few coal carriers and common cargo ships have been moving between lower lake ports. The locks at Sault Ste. Marie are scheduled to open Apr. 15. Although several ore vessels (notably taconite pellet carriers) are scheduled to start moving about mid-April, the ore fleet generally isn't likely to get up steam until early May—and then only a few vessels will be active at the start.

Three factors are behind the slow start of ore shipping on the lakes: 1. Near record stocks of ore on lower lake docks and in furnaceyards. 2. Sluggish blast furnace operations. 3. Increasing availability of imported ores.

It's estimated that stocks of Lake Superior ore on Apr. 1 stood at about 36 million gross tons, while the total inventory (ore from all sources) was 66 million (see table). At the current consumption rate, that's sufficient to support steelmaking operations for nine months.

• **More Pellets** — Oremen expect pelleted taconite and jasper concentrates to make up a larger proportion of Lake Superior ore shipments this year. Last year, pellet movement was about 11.2 million tons, about 16 per cent of total lake ore shipments.

Iron Ore Inventories High

(Thousands of gross tons*)

Apr. 1, 1961†	66,000
Apr. 1, 1960	41,836
Apr. 1, 1959	44,842
Apr. 1, 1958	53,052

†Estimated.
*Includes ores from all sources.

A record 52 per cent of all domestic ore was beneficiated in 1960 compared with only 27 per cent a decade ago. About 20 new beneficiating plants have been put into operation in the last three years, bringing the total to more than 90.

• **More Imports**—Heavy imports of ore from Canada, Venezuela, and other sources are expected to continue. Big shipments from new Canadian ore properties are reported scheduled to move via water and rail through Baltimore to Pittsburgh area furnaces. Imports totaled 34.5 million tons last year.

Off-the-record opinion of shippers points to a season tonnage not much larger than the 58.2 million tons shipped in 1958. Tonnage last year was 69.6 million vs. 46.8 million in 1959.

What New Ex-Im Bank Rules Mean

- **Easier credit and guarantees.**
- **More kinds of durable goods will be covered.**
- **More short term risks will be accepted.**
- **Bank will make advance commitments to guarantee sales.**
- **Political risk guarantees will cover trade fairs, leased equipment.**

BACKING UP his recommended foreign aid bill, President Kennedy has given U. S. exporters a boost by liberalizing the financing and guarantee programs of the Export-Import Bank of Washington. The action followed his recommendation for a five-year program to help underdeveloped countries raise their standards of living.

In the past, the Ex-Im Bank has sometimes been thought too conservative in its policies. Now it will look more at the experience of a firm in international trade and its credit rating, less at its detailed financial reports. It will guarantee and finance the exports of semifinished products and consumer durable goods against commercial risks for the medium term (up to five years). Political risk guarantees will be available on U. S. goods abroad on consignment, lease, or being exhibited at trade fairs. Short term (180 days) credit risks will be accepted, rather than only political risks as in the past. The bank will give advance commitments on guarantees and financing to insure U. S. exporters the best competitive position when they are bidding against foreign firms (except in the case of long term development loans).

The most important innovation in Ex-Im Bank policy: It will no longer demand that the sales it guarantees or finances be designed to contribute to the over-all development of a country. In other words, what U. S. salesmen can sell, instead of what they should sell for "social" reasons, is the latest criterion for aid. It means that automobiles, refrigerators, radios, television sets, and other consumer products which are typically U. S. standard-of-living items can now be sold in a bigger world market.

Roger Blough Heads Advisory Council

U. S. STEEL Chairman Roger Blough took on another tough job last week: The chairmanship of the Business Advisory Council. The group of 60 top business executives will be expanded to 65 to include three or four small business representatives. The council, which is almost 30 years old, acts as an advisory committee to the secretary of commerce. It has been under heavy fire from the press and some congressmen since the electrical equipment industry price fixing scandals. (Formal meetings will not be open to the press.) The council expects to take on assignments from the secretary which are designed to help the government formulate broad economic policy.

At the first meeting last week since President Kennedy took over, the council reported that the recession is bottoming out and predicted a leveling off or slight uptrend in the second and third quarters. A "substantial" increase is expected in the fourth quarter. Gross national product should hit $519 billion to $520 billion by the end of the year. However, warned the council, unemployment may not change much from its present level.

International traders on the council reported that the country is feeling increasing pressure from imports, that exports are growing but becoming tougher to increase, and that there is a growing tendency to look abroad for investment opportunities.

OCDM Looks at Rolla Facility

THE Office of Civil & Defense Mobilization has set up a committee to review the government's jewel bearing program with the goal of putting the Rolla, N. Dak., plant on a more businesslike basis. The Rolla plant is the only volume jewel bearing facility in the U. S. It's operated by the government through a private contractor.

Since the facility is regarded as essential to the mobilization base, the government has sought to keep it going by requiring all military instruments to contain Rolla bearings. Instrument manufacturers can charge the Defense Department the extra cost of using Rolla bearings, which are generally higher priced than imports.

The program has been "unsuccessful," comments a government source, so OCDM wants to augment it with sales promotion and sales engineering to get more commercial business.

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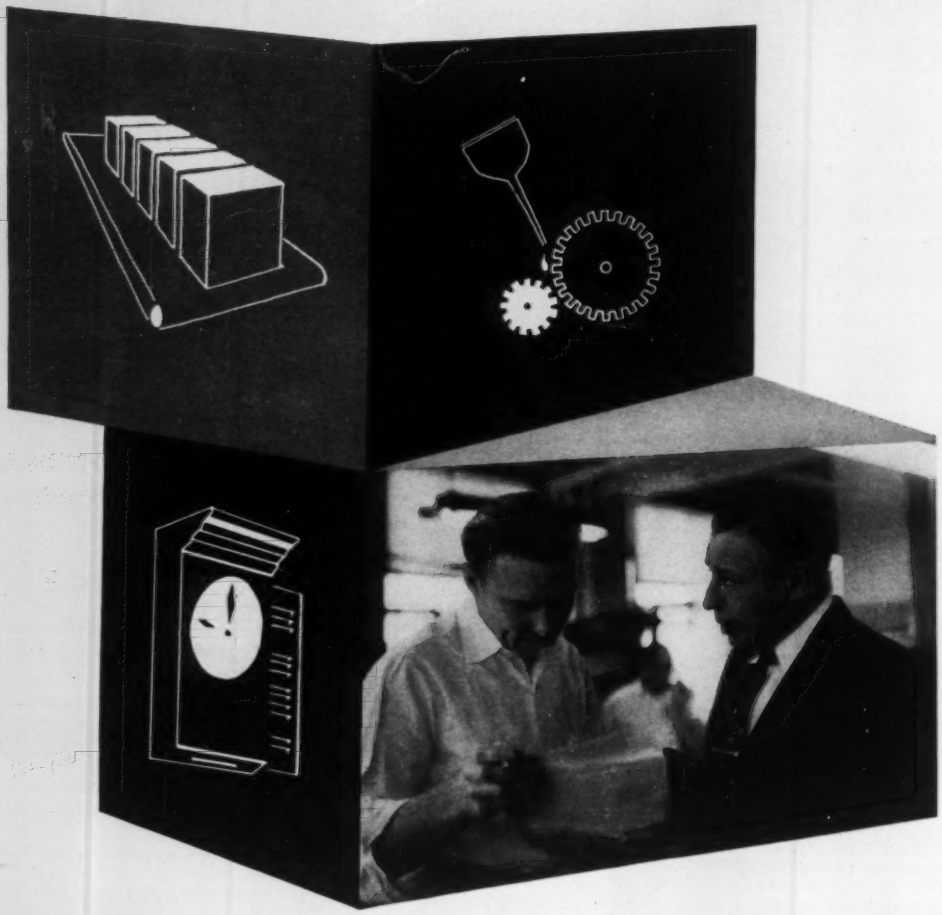

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Keysort is the only automated data processing system flexible enough to fit your company as it stands *and* as it grows. It is the one system adaptable and affordable to companies of every size. Anyone can use Keysort with only minimum training. It imposes no restrictions on plant operations, yet provides management with the full range of reports—labor costing, production control, inventory, lost time analysis, etc.

Easy to use in factory and office

Keysort cards are mechanically created and code-notched with your vital information. Classification and sorting are rapidly accomplished. Figures are automatically tabulated and summarized direct to reports—drastically reducing clerical burden. Management gets the information it needs *on time*. And at lowest cost.

Read about Keysort in action

Your nearby Royal McBee Data Processing Systems Representative will be happy to sit down with you, your plant managers and your foremen, to discuss a low-cost Keysort system tailored to your requirements. Call him, or write us at Port Chester, N. Y.—indicating the applications in which you are interested—and we will supply you with actual case histories from our files.

ROYAL McBEE *corporation*

NEW CONCEPTS IN PRACTICAL OFFICE AUTOMATION

$7 BILLION. That's a conservative estimate of metalworking's annual waste due to insufficient control over indirect labor costs. And more dollars are going down the drain every year because this is our fastest growing segment of employees and, experts contend, their productivity is declining, not improving.

INDIRECT LABOR

Our $7 Billion Opportunity

PROFIT GROWTH

CROUSE - HINDS CO., Syracuse, N. Y., saved $70,000 yearly by changing methods, setting standards, and installing incentives for order pickers in a warehouse. Cost per ton of goods shipped fell from $26.70 to $23. "And employee morale is better," declares Austin Vanderbilt, manager of industrial engineering.

RANCO INC., Columbus, Ohio, has every one of its employees on incentive. "If we didn't have our present controls, indirect labor productivity would be around 70 per cent. Our average is 115 per cent of the standard," says W. R. Opp, vice president-manufacturing.

ARMCO DIV., Armco Steel Corp., Middletown, Ohio, has work standards for 33 office departments. "We've had a 25 per cent increase, over-all, in productivity. In some departments, the improvement has been as much as 50 per cent," reports J. Paul Cain, director of industrial engineering.

DRAPER CORP., Hopedale, Mass., had 485 maintenance men in 1952. Today, with the same level of foundry output, the firm has 278. The company set standards and installed incentives.

WARNER & SWASEY CO., Cleveland, adopted standards and incentives. Unit labor costs fell 17 per cent in the stockroom, 45 per cent in a toolroom, and 34 per cent for lift truck drivers.

Says Harry Figgie Jr., president, Booz Allen Methods Service Inc., a new associated company of Booz, Allen & Hamilton: "The productivity of indirect workers is generally below 60 per cent. Work measurement and improved methods can raise that to 80 or 90 per cent. Add incentives, and the average will be around 120 per cent. So indirect labor productivity can generally be increased 100 per cent vs. about 63 per cent, on the average, for direct workers."

What Is Indirect?

"Indirect labor is any labor that doesn't change the size, shape, func-

tion, or finish of the product," says John W. Roberts, president, Albert Ramond & Associates, Chicago consulting firm. It includes such people as maintenance and setup men, material handlers, inspectors, janitors, warehouse workers, clerical and office workers, and supervisors. Says E. A. Cyrol, Chicago consultant: "Indirect workers are those people who add cost, but don't directly add value, to the product. They can, however, subtract value."

The Problem: How Big?

Last year, Westinghouse Electric Corp. spent twice as much for indirect labor and indirect material as for direct labor. Since 1941, the office staff has grown five times faster than the U. S. labor force as a whole, reports the National Office Management Association. The International Maintenance Institute says that in metalworking there is one maintenance man for every five or six production workers. Mr. Figgie reports that the number of production workers in manufacturing has increased only 0.1 per cent in the last ten years, while the number of nonproduction workers has increased 53.7 per cent.

That blooming army is a mighty inefficient force. In 18 of 19 industries studied by the Bureau of Labor Statistics, output per production worker is rising more rapidly than output per employee.

• **U. S. vs. Foreign**—The indirect labor problem, coupled with our big managerial class, is one important reason why we find it tough to compete with foreign firms. As Col. W. F. Rockwell, chairman, Rockwell Mfg. Co., points out: "A U. S. plant with 1200 hourly workers needs 912 salaried employees, while a U. S.-owned plant abroad with 1300 hourly workers needs only 221 salaried employees."

• **Its Causes**—Among the reasons why our indirect workforce has mushroomed, says Robert King, president, Profit Counselors Inc., New York consulting firm, are: Government demands, ineffective supervision, inadequate training, poor work scheduling, lack of performance standards, poor selection methods, weak systems and procedures, and the need by managers to have more knowledge (thus more and better reports) in areas such as quality control, production control, scrap costs, marketing.

"A company with 400 indirect workers can probably realize savings in that area equal to the before-tax profit on $5 million worth of sales if the firm's before-tax return is 10 per cent," declares Mr. Figgie. He points out that every annual wage saved in that case is roughly equal to $50,000 in sales.

What roads lead to that lucrative goal? Mr. Roberts suggests a 12-step approach: 1. Define the organization and departmental relationships and establish clear lines of authority and responsibility. 2. Evaluate job skills and train your people. 3. Examine wage rates. 4. Streamline procedures. 5. Upgrade planning. 6. Improve scheduling. 7. Improve methods. 8. Establish work standards. 9. Install incentives. 10. Plan preventive maintenance. 11. Tighten controls. 12. Improve communications.

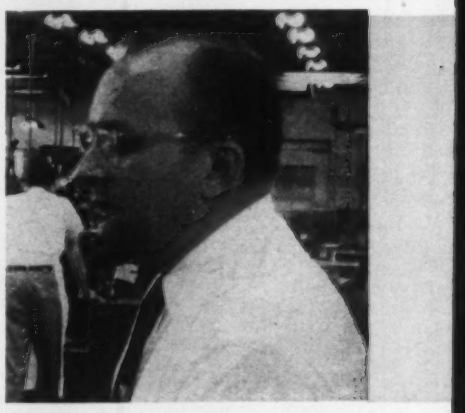
Measure Performance

In 1884, Lord Kelvin, the great inventor, said: "When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind."

He stated, precisely, today's indirect labor problem. Management doesn't recognize the waste because the indirect worker's performance has not been measured. But it can be—accurately. Says Mr. King: "You can set a standard for any job performed in industry."

And the payoff is usually outstanding. Listen to what R. F. Hancock, plant industrial engineer, Sonoco Products Co., Hartsville, S. C., told an Industrial Management Society clinic: "Our maintenance shops were 50 per cent efficient. When standards were set, the efficiency went up to 85 per cent. Then we added an incentive wage plan and performance climbed to an average of 117 per cent."

That showing is typical. Mr. Roberts reports these results of a direct measurement incentive program es-



"Indirect labor productivity is normally below 60 per cent. Work measurement and improved methods can usually boost it to above 85 per cent. Add incentives, and the average should exceed 115 per cent"

JOHN ROBERTS

"The average metalworking plant has twice as many indirect workers as it really needs. Improved methods, mechanization, work measurement, and incentives can vastly improve productivity"

E. A. CYROL

"A company with 400 indirect workers can probably realize savings in that area equal to the before-tax profit on $5 million worth of sales, if the before-tax return is 10 per cent"

HARRY FIGGIE JR.

"Too often, the office manager tries to enlarge his staff as much as possible, because it raises his stature in the company. That indictment can also be made of some company presidents"

ROBERT KING

tablished for a steel company's maintenance department:

	—PRODUCTIVITY— Before Work Measurement	Under Incentives
Painters	49%	132%
Pipefitters	20%	40%
Electricians	25%	65%
Welders	41%	93%
Sheet Metal Crew	42%	104%
Millwrights	32%	59%
Carpenters	38%	75%

The over-all increase in productivity is 100 per cent. The average incentive paid is 20 per cent. Net savings: 40 per cent of a 350 man payroll or about $840,000 a year. And, says Mr. Roberts, the program still has quite a way to go.

• **Other Benefits**—Work measurement has more benefits than increased productivity, though that is probably the most significant.

Mr. Cyrol mentions six: 1. Work standards permit improved balancing of workloads and better scheduling. 2. Suggested methods improvements can be analyzed more soundly. 3. Suggestions to purchase new equipment can be more accurately appraised and present equipment is better utilized. 4. Labor cost estimates (for pricing, budgeting) can be more soundly established. 5. Issued efficiencies make the foreman's job of "keeping after the men" much easier and more productive. 6. The employer-employee relationship is strengthened if pay per day and work per day can be defined.

Mr. Roberts adds three more: 1. Fewer direct supervisory controls are needed. 2. Service to production departments is improved considerably through more effective use of less indirect manpower. 3. Training is easier and more effective.

• **Ways to Measure**—As with setting standards for direct labor, everyone has pet methods of measuring indirect work. Many of them are parallel. Putting the modes into broad categories, these are commonly used: 1. Past performance—standards are based on historical performance. Weakness: They're based on actual costs, not what the costs should be. 2. Estimating—this varies from guesstimate to expert opinion. It's inexpensive, but inconsistent and can be highly inaccurate. 3. Work sampling—Standards are

based on random observations and statistical analysis. In the hands of an expert, this tool can be helpful without being too costly. But its use is limited and it will not give the precise data that can be obtained with more expensive methods. 4. Direct measurement—this is the traditional time study approach, expensive but accurate. 5. Pre-established data—this is time study data accumulated over a long period for a common function and applied to that function in another plant. It can be highly reliable for many jobs if properly applied. Mr. King and Mr. Roberts say data are available today to cover between 70 and 80 per cent of the indirect jobs in most plants. Mr. King says the figure exceeds 80 per cent for offices. In some cases, time study will be necessary to double check the predetermined data for accuracy. Mr. Cyrol says standard data have this limitation: You can't learn the job as well as you do by time study. So you may not recognize good ways to improve the method. But he says it is a highly successful technique for most jobs if you haven't the time and money to do direct individual measurement. Mr. Roberts points out that pre-established data are highly reliable for such jobs as window cleaning and glazing, motor rebuilding, painting, repairing floors, installing plumbing fixtures, maintaining machine tools, and a wide variety of clerical jobs.

• Cost—Because few industrial engineering departments have adequate experience in establishing indirect labor standards, most firms call on consultants to help get their programs rolling. The cost? Mr. Figgie says the client should get his money back in 2 to 12 months.

The administrative cost of maintaining a standards and incentives program depends on many variables, but Mr. Roberts says it will usually not exceed 4 per cent of the payroll covered.

Improve Methods

The order pickers in Crouse-Hinds Co.'s warehouse used to be assigned to zones. A conveyor wound its way through the zones. When a picker saw a box marked for his zone, he picked it off the conveyor, filled the order, and set it back on. The operation was time studied and the firm found that the men were working less than half the time. So the men were given go-carts and put on duty throughout the warehouse. The conveyor now runs only around the periphery of the building. Storage space was increased 12 per cent, and the new method, combined with standards and incentives, brought $70,000 annually in labor savings. The firm also improved janitorial methods and put the men on incentives. Result: The crew was cut from 30 to 20.

Says Mr. Cyrol: "You don't separate one phase of this job from another. You try to improve the method and standardize the procedure where practical, then set the standard, continuing to improve the method. You mechanize where practical and readjust the standard."

Mr. Figgie agrees: "Before you set standards, you flow chart the method and do a good work place layout. But you never stop trying to improve the method. And you always examine the feasibility of mechanizing. Also, in clerical operations, there's a tendency for people to become too specialized. You frequently can combine departments."

Mr. King tells of a firm that was able to eliminate four of its 17 people in order processing and invoicing by adopting one simple methods change. Invoices had been reinserted into typewriters to add shipping costs. That cost is now penciled in.

Mr. Cyrol tells of several cases where efficiency was upped substantially just by equipping the punch press setup men with a dolly for tools. The men had been wasting more than 25 per cent of their time just hunting for tools and parts, a time study showed.

Mr. Roberts mentions these methods improvements that are almost universally applicable: 1. Closer coordination of departments. 2. Simplification of forms. 3. Improvement of scheduling. 4. Simplification of reports on cost data.

Mechanize for Efficiency

Crouse-Hinds increased shipping-room efficiency by using automatic nailing guns to assemble export crates. It increased storage space by purchasing narrow aisle lift trucks.

L. B. Foster Co., Pittsburgh, installed a punched card, data processing system. Sales have increased 150 per cent and the number of executives and salesmen has more than doubled. But the number of other office employees has increased less than 40 per cent.

Those examples indicate the improvement possible through mechanization of indirect functions.

And equipment manufacturers are designing new products to bring bigger gains. Royal McBee Corp., for example, has recently announced its RPC-9000 computer that accepts data in random order (from punched tape, punched cards, or through the typewriter keyboard), and automatically updates all affected records in a single, uninterrupted sequence of operations. Up to 30 input and output units may be operated simultaneously "on line."

Training & Supervision

The consultants agree that training and improved supervision hold the key to getting the maximum benefits from measurement, methods, and mechanization. As Mr. Figgie puts it: "Indirect labor operations are so inefficient today that almost anybody can take some people out. The trick is to keep them out via proper controls and a well-established program of supervisory training."

Adds Mr. Cyrol: "The entire effort can be for naught unless you convince the supervisors that the new setup is worthwhile and instruct them in making optimum use of standards, systems, and equipment."

PLAN FOR PROFIT GROWTH

Our Pressure from Idle Capacity

On Apr. 24, STEEL will point up the problems metalworking faces due to its excess production capacity, and suggest some ways to alleviate that pressure. For a free copy of any or all articles in this series (appearing biweekly since Jan. 16), write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio

Shell Tellus Oils are refined and formulated to meet exacting hydraulic service requirements, such as in this forming machine.

PHOTO COURTESY ATLANTIC PLASTICS INC., STAMFORD, CONNECTICUT

BULLETIN:

Shell provides a quick 6-point check list for hydraulic oils: Use it to pick the right oil for your needs

Selecting the proper hydraulic fluid for your equipment can be one of your most important decisions. And it can pay off in many ways. Less down time. Lower cost per unit. Longer equipment lite.

Here are six bench marks to help you pick the best hydraulic oil tor your plant requirements.

1. Does it have good oxidation stability? Oxidized hydraulic oil can form gums, lacquers and other deposits which may foul moving parts. Shell Tellus Oils are carefully refined to remove unstable, sludge-forming components, then fortified with a Shell-developed oxidation inhibitor.

2. Will it resist foaming and emulsification? Pump chatter and erratic operation are often the result of pump cavitation, brought on by oil foaming. Tellus® Oils contain powerful additives to help prevent foaming.

They also contain a selected inhibitor to combat effects of moisture that might be in the system.

3. Does it fight rust and corrosion? It is difficult to exclude all moisture from a hydraulic system. And moisture can form troublesome rust. Shell Tellus Oils have been carefully compounded to resist corrosion.

4. What are its lubrication qualities in continuous service? Shell Tellus Oils form a clinging, oily film on mating metal surfaces. This maintains a constant guard against wear.

5. How does it react to temperature changes? This is a key factor in the performance of hydraulic equipment. Careful selection of the proper viscosity grade of Tellus assures satisfactory operation of your system over its entire temperature range.

6. Is it available in several viscosity grades? Shell Tellus Oils are available in a broad range of viscosity grades. There's a special grade for virtually every hydraulic requirement.

Ask your Shell Industrial Products Representative for facts on Tellus Oils. Or write: Shell Oil Co., 50 West 50th St., New York 20, N. Y.

A message to manufacturers of hydraulic equipment

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1. Your customers can get Tellus Oils at Shell depots everywhere. Readily available throughout the world.

2. Quality is consistently high. Tellus always delivers top performance.

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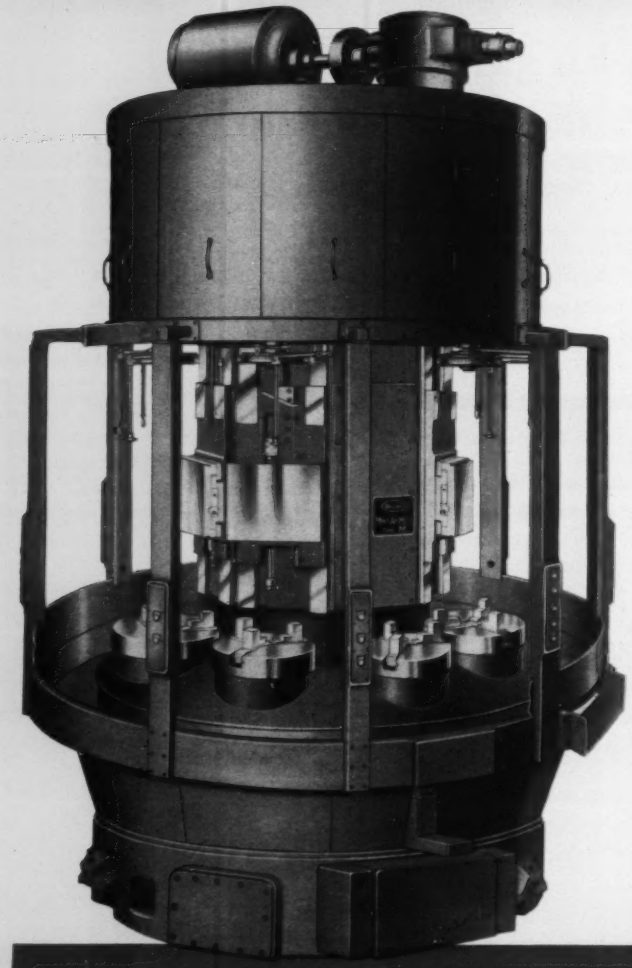


NEW Bullard Mult-Au-Matic Type "M"

Contrary to the general upward trend in the cost of new plant production equipment, The Bullard Company is offering the *new* Type "M" Mult-Au-Matic at a price which is *lower than competitive methods.*

Designed and built according to exacting Bullard standards, the *new* Type "M" Mult-Au-Matic incorporates many new features of rigidity, accuracy and productivity which have made this machine famous the world over.

For complete information on the *new* Bullard Type "M" Mult-Au-Matic, call your nearest Bullard Sales Office or Distributor or write to

The Bullard Company, Bridgeport 9, Conn.

Only Minor Changes Set for '62s

THREE ADDITIONAL models, four new body shells, and several new engines mark the extent of the 1962 model change. Cars will be shorter but fancier. Fins will be gone. The biggest aim of car companies is to hold the price line. Few price increases are expected when new models begin to appear next September.

Ford and Chevrolet divisions are preparing shorter wheelbase cars with new bodies and new engines. Plymouth and Dart will also sport new body shells. So will the larger Ramblers.

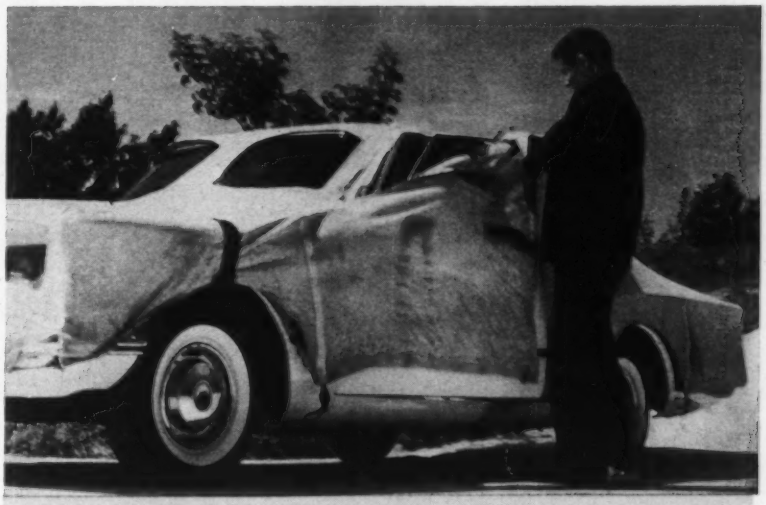
Ford Gets 'Senior' Compacts

Ford will offer two new models, one for each of its sales divisions. They're now dubbed Canadian X and Y. The Y job is slated for Lincoln-Mercury Div. It will be 203 in. long—on 116 in. wheelbase, say tipsters. The body shell is the same as the X shell, but it's extended slightly, much like the Falcon shell is pieced out in the trunk area to adapt it for the Comet. The larger car will weigh about 150 lb more than its smaller relative. Both cars will reportedly feature the torque box, integral frame design where side rails are moved outboard and welded into the rocker panel area.

The two models will fit into the lineup just above Falcon and Comet. They'll be priced to compete with the F-85, Tempest, and Buick Special. Using the experience gained in Falcon's engine design, Ford is programing a lightweight V-8 powerplant that will be built at its Brookpark (Ohio) facilities. It's supposed to be 20 per cent lighter than the present 223 cu in., six cylinder engine, but it will have at least ten more horsepower, claim company sources.

Stylewise, Ford is losing the rest of its fins. Rear quarters are being squared off. More massive trim panels will be located across the rear. Front grilles are still horizontal, but they too are heavier and wrap around more toward the sides of the car.

Looking ahead to 1963-64, Ford is planning still another body shell on a 106 in. wheelbase. It's also readying a new body for the 109 in. wheelbase Falcon. When those cars move into production, the story is that the 119 in. wheelbase types will be phased out. That would leave the Ford Div. with a wheelbase lineup ranging from 99 in. (Cardinal) to 115 in. (Canadian X). Comet and Mercury cars will overlap slightly and extend into the bigger sized cars Ford will need to remain competitive with medium priced GM makes.



Speculation Veils '62 Models*

	Chevrolet's H-35	Ford's Canadian X**
Length	196 in.	197 in.
Wheelbase	114 in.	115 in.
Weight	2600 lb	2760 lb
Engines	Gray Iron 4	Gray Iron V-8
Horsepower	110	145
Displacement	153 cu in.	220 cu in.

*Specifications are not official but are based on best available industry information.
**Ford's Canadian Y car for Lincoln-Mercury Div. will be 6 in. longer. Both Chevrolet and Ford will offer other engines.

Still No Tiny Chevrolet

Rumors persist that Chevrolet has a Cardinal sized car in the works, but no tooling has shown

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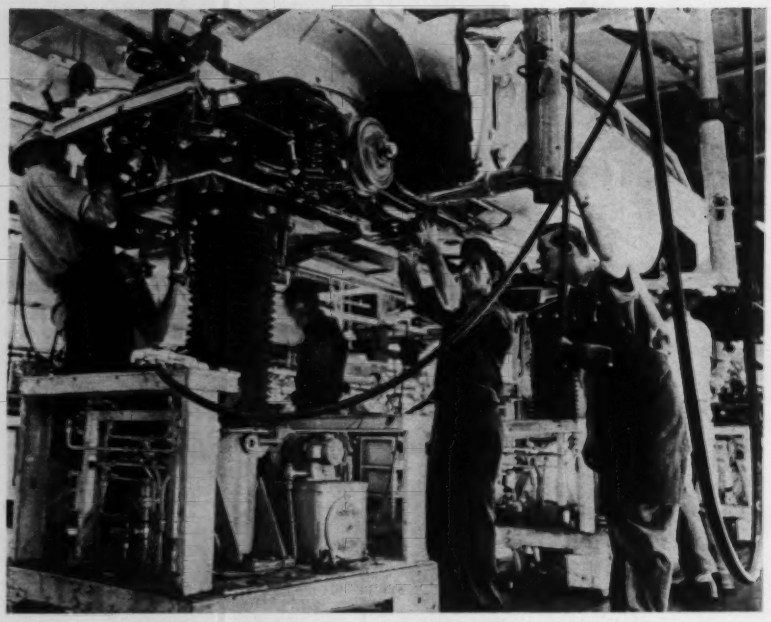

Buick Initiates New Assembly Technique

SKYLARK, Buick's luxury compact, will be built up with this unique assembly technique. Drive train components are hoisted up to the body on air actuated lifts. The newest series in the Special line will arrive in dealer showrooms May 13. Factory list price is $2395, without the fabric top or bucket seats.

up. Several division informants agree that while such a car has been designed, it's not likely to be released for production. Meanwhile, tooling deadlines for the H-35 will expire next month. The car will be sharing many unitized body shell parts with the smaller Buick, Oldsmobile, and Pontiac models. It will feature single leaf rear springs (STEEL, Mar. 6, p. 47) and will use the division's new line of four, six, and eight cylinder engines. Supplier sources say that most of the tooling on Chevy's present six cylinder line will be used to machine both the four and six. The car will feature the transaxle arrangement now in production for Corvair and Tempest.

Larger Chevrolets will lose 3 in. in length. The division will start limited production on a lightweight automatic transmission at its Toledo, Ohio, plant. By 1963, it will replace all the division's present automatic shifts. Additional production will be phased in at Cleveland. The transmission housing will be an aluminum casting, not gray iron. Rotor blades will be snapped into place, using a unique design and manufacturing technique. Tooling will cost more than $12 million.

Plymouth Draws New Body Too

To keep pace with Ford and Chevrolet, the Plymouth-Dart body shell will be cut back from a 118 to a 115 in. wheelbase. It will be 3 in. shorter. Width is reduced to 72 in. For a hint on front end styling trends, take a look at Chrysler's latest dream car, Turboflite (STEEL, Mar. 13, p. 94).

On a corporate basis, Chrysler is reportedly turning its brake business over to Bendix Products Div., South Bend, Ind., Bendix Corp. The division now supplies Valiant brakes, but starting with the '62 model run, it is supposed to build 25 per cent of Chrysler's brakes. By 1963, it will be the company's major brake supplier.

Spray Speeds Descaling

DESCALING stainless steel strip may be simplified by a salt spray process developed by Kolene Corp., Detroit. Instead of running the strip through a molten salt bath during the anneal and pickle cycle, pure salt is sprayed on at 900° F, coming out nozzles at 30 psig. Then the strip is pickled, rinsed, and brushed.

John H. Shoemaker, president, says the spray equipment can be inserted into existing processing lines. He claims these advantages:

1. The equipment can be shut down or started up in a few minutes.
2. Scratching the strip is avoided because rubber rolls or neoprene coated steel rolls can be used to guide the steel.
3. Salts and pickling acids can be changed quickly to process different types of steel coils.

Kolene's pilot line handles continuously fed 10 in. coils at 22 fpm. For test purposes, previously annealed strip is fed through rubber tensioning rolls, then into a gas fired furnace where it's preheated at 600 to 1000° F. Normally, it would come out of production annealing furnaces at those temperatures.

U. S. Auto Output

Passenger Only

	1961	1960
January	415,857	688,690
February	364,387	659,298
March	.....	654,242
April	.....	582,900
May	.....	611,226
June	.....	613,147
July	.....	434,377
August	.....	305,527
September	.....	407,685
October	.....	617,816
November	.....	597,132
December	.....	522,239
Total	.....	6,694,288

Week Ended	1961	1960
Mar. 4	92,024	138,513
Mar. 11	91,202	145,967
Mar. 18	71,083	145,852
Mar. 25	87,808	137,385
Apr. 1	101,902†	147,830
Apr. 8	85,000*	133,460

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

Ernst cuts steel costs to customers up to 10% with three new Wean Coil Processing Lines

Jim Moon, sales engineer of McKay Machine (above left), represents Wean Equipment Corporation in the Buffalo area. During a recent call on Ernst Iron Works, Division of Ernst Steel Corporation, Jim talked with Carl Grosse, Plant Superintendent, about the three Wean coil processing lines recently installed by this major metals warehousing firm.

According to Mr. Grosse, the Wean slitting, shearing and coil banding lines have reduced Ernst's handling, labor and scrap costs up to 10%. In addition to providing lower costs to Ernst's customers, this modern coil processing system helps this firm give fast service while easing inventory and supply problems through the purchase of standard size coils.

Equipped with modern, automatic controls, the Wean coil processing lines are operated by only four men and can handle 20,000 lb. coils, up to 54" wide and from .015" to .135" thick.

The McKay Machine Company, sales representatives for Wean Equipment Corporation to the metalworking and warehousing industries, will be able to assist you with complete engineering and technical information in planning your slitting and shearing requirements. Why not contact a McKay sales engineer to see how Wean coil processing equipment can help lower your costs.

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When you require specific physical properties combined with accurate dimensions in spring steel, call Sandvik.

From composition, through processing to the finished strip, Sandvik has had long experience in precision-control. That is why you find Sandvik steels used for feeler gauges, watch springs, compressor valves, camera shutters, reeds, shock absorbers and many other exacting spring steel applications.

Sandvik supplies cold rolled specialty strip steels—

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- **In straight carbon and alloy grades.**
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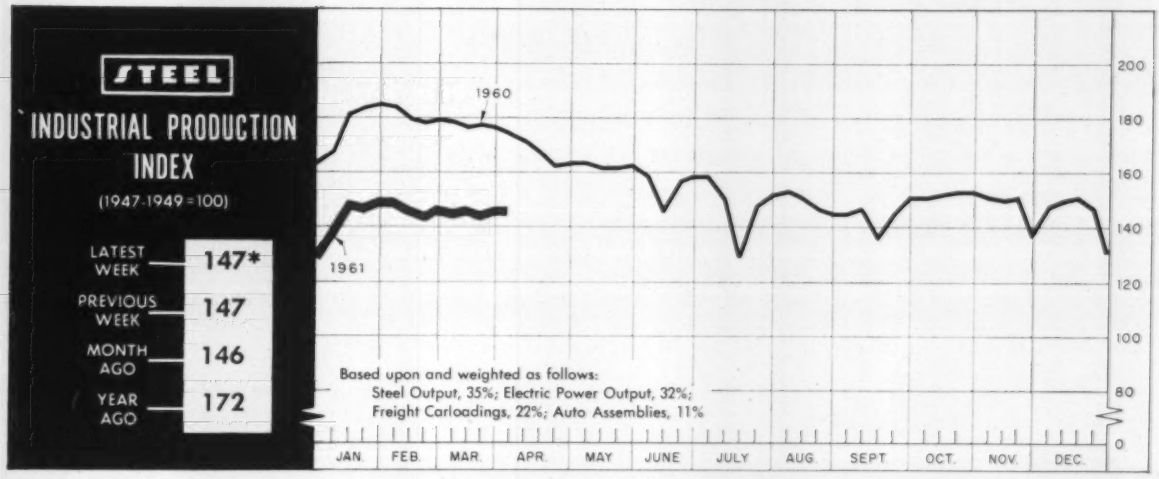

*Week ended Apr. 1.

More Fuel for the Recovery's Glow

STEEL's INDEX of industrial production remained firm for the week ended Apr. 1, despite some slowdown in industrial activity incurred on Good Friday.

The index is running counter to its historical pattern. Ordinarily, it declines in the first quarter (see STEEL, Feb. 27). Now, with the first quarter history and the stability still evident, the belief that the recession is over and an upturn pending is strengthened.

Excluding the first week of the year (which is always down due to the New Year holiday), the peak-to-trough shift in STEEL's barometer during the first quarter reveals only a 5 point spread. A 7 point spread (in 1956) is the most recent comparable performance. The difference last year and in 1959 was 12 points. It was 19 points in 1958; 10 points in '57.

Two other indicators which demonstrate the firmness of the economy and an impending recovery are cited by James M. Dawson, vice president and economist, National City Bank of Cleveland. Mr. Dawson's confidence in the indicators is warranted by their warning of a possible downturn in the economy at this time last year and their anticipation of the recovery in the business climate in 1954 and 1958.

● **Deposits Rising**—One is monetary. Historically, growth in demand deposits of individuals and business slows down or stops well in advance of a business recession. Similarly, growth in deposits is resumed prior to upturns in the economy.

The logic, comments Mr. Dawson, is that an increased money supply means improved liquidity and more potential stimulus for the economy. Conversely, dwindling gains in deposits or even reductions spell reduced liquidity and stimulus,

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	1,648[1]	1,632	2,417
Electric Power Distributed (million kw-hr)	14,100[1]	14,291	13,542
Bituminous Coal Output (1000 tons)	6,615[1]	6,445	8,710
Crude Oil Production (daily avg—1000 bbl)	7,300[1]	7,366	7,151
Construction Volume (*ENR*—millions)	$405.1	$353.9	$383.7
Auto, Truck Output—U. S., Canada (*Ward's*)	130,014[1]	117,916	186,579
TRADE			
Freight Carloadings (1000 cars)	480[1]	500	618
Intercity Truck Tonnage (changes from year ago)	−2.8%	−3.9%	+18%
Business Failures (Dun & Bradstreet)	359	363	286
Currency in Circulation (millions)[2]	$31,775	$31,887	$31,534
Dept. Store Sales (changes from year ago)[2]	+6%	+9%	−7%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$27,762	$30,603	$24,480
Federal Gross Debt (billions)	$287.6	$289.9	$287.0
Bond Volume, NYSE (millions)	$24.8	$39.2	$26.8
Stocks Sales, NYSE (thousands of shares)	19,760	26,984	12,208
Loans & Investments (billions, adjusted)[3]	$109.1	$102.2	$101.5
U. S. Govt. Obligations Held (billions)[3]	$29.5	$30.2	$24.8
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	213.5	213.5	219.2
All Commodities[6]	119.5	119.7	119.7
Commodities Other than Farm & Foods[6]	127.9	128.0	128.2

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

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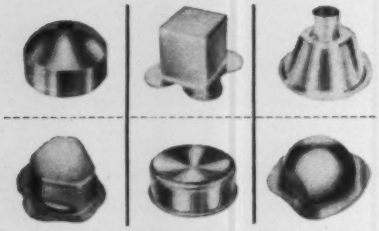

Closest tolerances adhered to in all metals, including MU METAL, BRASS, INCONEL, ALUMINUM, COPPER, CARBON STEEL, STAINLESS STEEL, NICKEL, MAGNESIUM, TITANIUM, SILVER, SPECIAL ALLOYS, HAYNES STELLITE.

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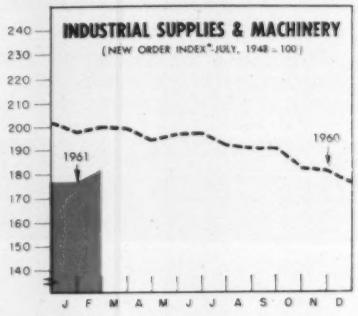
METAL CRAFTSMEN
SINCE 1924

THE BUSINESS TREND



	Bookings		Shipments	
	1961	1960	1961	1960
Jan.	220.8	243.4	227.3	207.3
Feb.	218.3	278.6	214.4	230.2
Mar.	....	231.8	....	244.6
Apr.	....	249.2	....	234.8
May	....	246.9	....	241.3
June	....	269.8	....	253.6
July	....	217.5	....	210.8
Aug.	....	255.8	....	217.3
Sept.	....	197.9	....	223.5
Oct.	....	219.9	....	220.6
Nov.	....	198.9	....	226.7
Dec.	....	216.5	....	220.0
Avg	....	235.5	....	227.6

American Gear Mfrs. Assn.

	1961	1960	1959	1958
Jan.	176	198	186	163
Feb.	181	200	202	157
Mar.	....	199	221	149
Apr.	....	194	218	148
May	....	196	218	152
June	....	197	212	164
July	....	191	216	170
Aug.	....	190	212	172
Sept.	....	190	207	178
Oct.	....	182	204	187
Nov.	....	181	202	189
Dec.	....	176	202	190

*Seasonally adjusted.
Amer. Supply & Machinery Mfrs.' Assn.

Charts copyright, 1961, STEEL.

increasing chances of a setback.

The present upward trend in the deposit curve suggests recovery.

• **Production Gains**—The second barometer is a diffusion index derived from the trends in 20 industries included in the Federal Reserve Board's industrial production index.

The successive number of months each industry has risen or fallen is listed. A "no change" is recorded as zero. Movements of more than six months are still listed as six. The 20 numbers are then averaged.

Mr. Dawson believes that a concentrated movement with most industries participating is likely to continue. However, if the movement becomes mixed, with some industries rising and others falling, a change in direction is presumably developing.

Thus far in 1961, the improvement in this index has been small. But it does represent the best level since last summer.

Unemployment a Problem

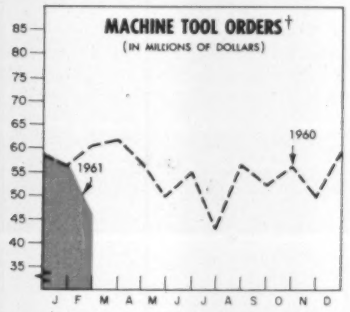
Despite the cheering notes of those and other business indicators, the fact that unemployment remains at a high level (although unemployment increases have apparently ceased) has created some concern about the upturn.

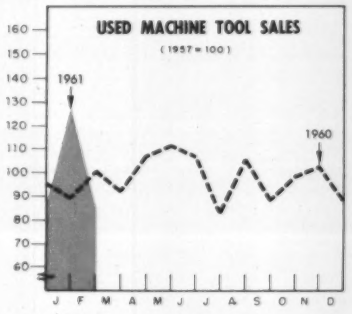
Seasonally adjusted unemployment in February (when it is usually at its peak) remained virtually unchanged from December and January. It was also below the postwar high of July and August, 1958.

The widely reported statement that the absolute number of jobless in February was the highest since the summer of 1941 may be misleading.

The figure doesn't account for the growth in the economy and gains in employment since that time. When the comparison is made in terms of the relationship between unemployment and employment, the picture takes on a more positive air. Nevertheless, several observations give rise to concern over the employment situation.

While it is true that the number not working is no worse than it was in two of the three previous postwar recessions, there is a higher level of "long term" unemployed—15 weeks or more. Such unemployment often involves particular groups of





	New Orders (000 omitted) 1961	1960	Shipments (000 omitted) 1961	1960
Jan.	$56,100	$56,450	$45,500	$46,400
Feb.	46,000*	60,600	45,950*	51,950
Mar.	.....	61,950	.....	64,500
Apr.	.....	51,850	.....	55,100
May	.....	49,950	.....	56,350
June	.....	55,100	.....	63,100
July	.....	42,950	.....	51,300
Aug.	.....	56,850	.....	47,900
Sept.	.....	52,300	.....	53,950
Oct.	.....	56,200	.....	51,350
Nov.	.....	49,950	.....	48,550
Dec.	.....	59,000	.....	61,350
Totals	.....	$653,150	.....	$651,800

†Cutting and forming. *Preliminary. National Machine Tool Builders' Assn.

	1961	1960	1959	1958
Jan.	126.5	89.2	84.9	93.9
Feb.	83.8	100.3	114.9	94.6
Mar.	....	91.4	108.1	82.5
Apr.	....	106.7	103.1	81.5
May	....	111.1	113.0	77.2
June	....	106.4	101.9	86.8
July	....	82.2	105.0	89.2
Aug.	....	105.0	108.4	72.5
Sept.	....	87.9	114.6	88.1
Oct.	....	98.4	112.6	99.9
Nov.	....	101.8	98.4	94.9
Dec.	....	87.8	95.5	104.9
Avg	....	97.4	105.0	88.8

Source: Machinery Dealers National Association.

workers, or certain age levels, or particular geographic areas. The situation is explained by changes in industrial techniques, or by changes in the fortunes of certain industries. However, the Department of Labor's classifications for March show that in a total of 150 major labor market areas, 101 report 6 per cent or more of the total labor force is out of work.

• **Jobs Exported?**—It is frequently assumed that the sharp drop in U. S. export trade in 1958 and 1959 contributed greatly to our unemployment problem. However, the merchandise trade surplus, which totaled $3.3 billion in 1958 and fell to only $910 million in 1959, jumped to $4.7 billion last year.

Some industries and areas are dependent on foreign trade and are sensitive to changes in foreign commerce. But the increase in export trade during 1960 was not accompanied by a significant improvement in employment.

One possible explanation: The situation substantiates the theory that our economy has not been expanding rapidly enough to absorb the increase in the labor force.

Auto Output Rising

STEPPED UP factory output, some rehiring, and an easing of assembly downtime in motordom, is revealed by *Ward's Automotive Reports*. The publication says car production schedules point more and more to a 5.8 million production year.

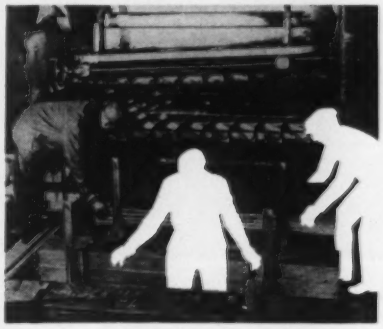
New forecasts lift production for the April-June quarter up to 1,406,000 passenger cars, an 18.4 per cent rise from the 1,187,250 turned out in January-March. The April program alone calls for a 6.9 per cent increase in absolute volume and 22.9 per cent rise in daily rates over the March level.

The planned upturn would kick the second quarter level to 77.8 per cent over the same period of 1960.

Ward's also reports that the strongest upward movement of the year is shaping up for U. S. truck manufacturers. A 14.1 per cent increase over the March level in the daily rate of truck production is being programed for April.

The spring buying spurt is materializing as expected, aided by large fleet purchases. Demand for the compact, economy type trucks continues unabated.

USING FRIED EQUIPMENT



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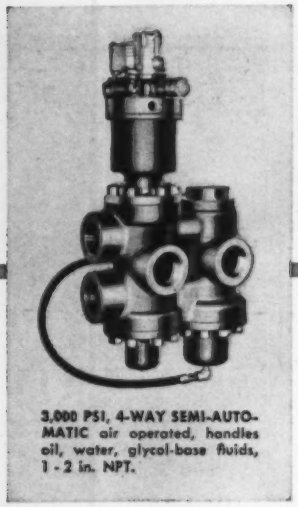
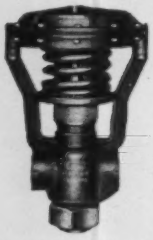
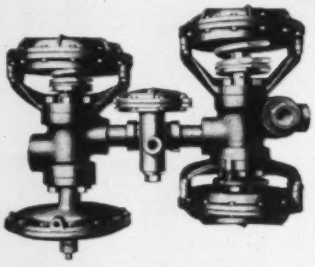


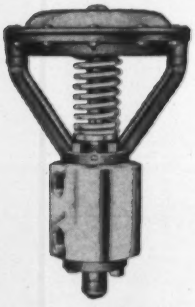
3,000 PSI, 4-WAY SEMI-AUTOMATIC air operated, handles oil, water, glycol-base fluids, 1 - 2 in. NPT.



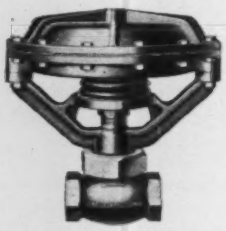
300 PSI, 3-WAY OR REVERSE ACTING bridge yoke, triple-guided stem, ¼ - 3 in. NPT.



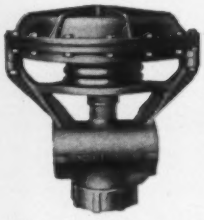
4,000 PSI, 3-WAY AUTOMATIC 2-pressure, auto-neutral, throttling, ½ - 3 in. NPT.



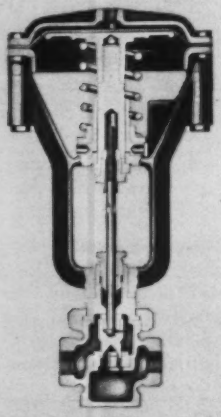
4,000 AND 6,000 PSI, 2 AND 3-WAY BALANCED NC or NO, pressure above or below seats, ½ - 2 in. NPT.



150 AND 300 PSI, DIRECT ACTING globe body, top-guided stem, ¼ - 3 in. NPT.



150 PSI, 3-WAY OR REVERSE ACTING, ¼ - 3 in. NPT VACUUM, 2-WAY, 1 - 3 in. NPT compact design, positive sealing, bridge yoke.



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GEORGE A. GARRISON
Norton purchasing agent

LOREN H. BONNETT
Eljer Div. gen. mgr.

E. C. JETER
Ford-Engine & Foundry mfg.

RICHARD U. ZEHE
Steel Improvement sales

George A. Garrison was appointed purchasing agent at **Norton Co.**, Worcester, Mass. He has been in Santa Clara, Calif., serving as manager of Norton's West Coast plant since it opened in 1955.

Loren H. Bonnett was made general manager, **Eljer Div.**, Pittsburgh, Murray Corp. of America. He was general sales manager of the division.

Harry S. Jeske was appointed president and general manager of Kwik-Mix Div., Port Washington, Wis., **Koehring Co.** He succeeds the late **E. W. Maas.**

George D. Leigh was made product manager, trucks for **LeTourneau-Westinghouse Co.**, Peoria, Ill.

J. Penn Rutherfoord, general manager of Raytheon Co.'s Commercial Apparatus & Systems Div., was named executive vice president of **International Resistance Co.**, Philadelphia, effective Apr. 17.

E. C. Jeter was made general manufacturing manager, Engine & Foundry Div., Dearborn, Mich., **Ford Motor Co.** Formerly manufacturing manager-foundries, he replaces **Robert Stevenson**, now general manager, Transmission & Chassis Div. **H. C. Grant** replaces Mr. Jeter. **William E. Goudey**, production manager, replaces Mr. Grant as manager, Dearborn Iron & Specialty Foundries.

J. Davidge Warfield was named vice president-sales of **Veeder-Root Inc.**, Hartford, Conn. He was manager of marketing.

Clyde Hotchkiss was appointed manager-quality control, **Warner Electric Brake & Clutch Co.**, Beloit, Wis. He formerly served with Motor Products Corp. and with Aviation Div., Sundstrand Corp.

L. S. Hamaker, assistant vice president-sales, was elected vice president-marketing for **Republic Steel Corp.**, Cleveland.

Richard U. Zehe, former California assistant district manager, was appointed manager, turbine and missile sales, for **Steel Improvement & Forge Co.**, Cleveland.

Eugene H. Kolb was made vice president and general manager of **Chapman Valve Mfg. Co.**, subsidiary of Crane Co. He will be at Indian Orchard, Mass. He was general manager of Ralph J. Stolle Co.

Russell F. Gotha was appointed manager of the Bridgeport, Conn., plant of **Stewart Die Casting Div.**, Stewart-Warner Corp. **Albert J. Booth**, manager of the Bridgeport plant since January, 1959, was transferred to the Chicago plant as assistant to L. G. Vanderhoof, vice president of Stewart-Warner, and general manager of Stewart Die Casting Div.

Marvin Van Dusen was appointed product sales manager of Powrworker electric hand trucks for In-

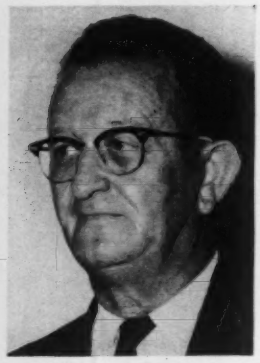
J. PENN RUTHERFOORD
Intern'l Resistance exec. v. p.

CLYDE HOTCHKISS
Warner Electric Brake post

L. S. HAMAKER
Republic Steel marketing

MARVIN VAN DUSEN
Clark Equipment sales

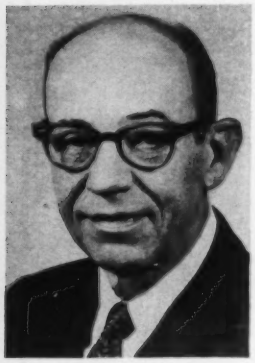
WALTER H. MURPHY



EDWARD W. GLAUSER

Transue & Williams div. vice presidents

A. FRED MORRIS JR.



ROY P. WILLIAMSON

Morgan Engineering vice presidents

dustrial Truck Div., **Clark Equipment Co.**, Battle Creek, Mich.

Transue & Williams Steel Forging Corp., Alliance, Ohio, elected **Walter H. Murphy** vice president-manufacturing, Forging Div.; and **Edward W. Glauser** vice president-manufacturing, Stamping Div.

Myron Geller was named sales manager, Wheel Excavator Div., **Wellman Engineering Co.**, Cleveland. He was sales manager, Marion Power Shovel Co.

Alexander C. Andrew was appointed superintendent of gray iron operations for **Springfield Foundry Co.**, Indian Orchard, Mass.

Howard H. Schreiber was made general manager of **Chicago Thrift-Etching Corp.**, Chicago, subsidiary of Dodge Mfg. Corp. He was vice president-sales manager of Poray Inc.

Harry B. Smith was made assistant to the sales manager, **Realock Fence Dept.**, Colorado Fuel & Iron Corp. He will have headquarters in the corporation's Wickwire Building, Buffalo.

Earl S. Mollard was named vice president-mining operations, **Hanna Mining Co.**, and general manager of mines for **M. A. Hanna Co.**, Cleveland.

Youngstown Sheet & Tube Co. named **Walter C. Ibele** assistant superintendent, Seamless Tube Mill Finishing Dept., at the Campbell, Ohio, Works. He succeeds **Winston A. Schoenberger**, who joined the company's Continental-Emsco Div. at Houston.

Morgan Engineering Co., Alliance, Ohio, appointed **A. Fred Morris Jr.** vice president-sales. **Roy P. Williamson** was made vice president of international sales, a newly organized division. He was vice president-sales.

Westinghouse Electric Corp., Pittsburgh, appointed **William R. Tincher** to the Antitrust Section of its Law Dept. to work with **Thomas M. Kerr Jr.**, head of the Antitrust Section. Mr. Tincher was associate director of the Bureau of Litigation, Federal Trade Commission.

Norman R. Amberg was appointed manager of the Detroit Industrial & Machine Tool Dept., **Radio Corp. of America**. He will supervise engineering, production, and marketing of RCA's line of electronic inspection and gaging devices. He succeeds **I. C. Maust**, who resigned. Mr. Amberg was with Yale & Towne Mfg. Co. **Everett M. Kruger** was made manager-systems and procedures, RCA Electronic Data Processing Div., Camden, N. J.

G. F. Kolle joined **Inductotherm Linemelt Corp.**, Delanco, N. J., as assistant general manager and treasurer. For the last eight years, he has been with Ajax Engineering Co. (now Ajax - Magnethermic Corp.).

Nathaniel R. Kidder, former president of Kidder & Co., marketing-management consulting firm, was appointed to the new post of manager of marketing services for **Jack & Heintz Div.**, Cleveland, Siegler Corp.

Jack W. Gunstream was made assistant plant manager, Gary, Ind., for **American Bridge Div.**, U. S. Steel Corp.

Joseph S. Turner, director of purchases, was named manager-production control and purchasing for **LFM Mfg. Co. Inc.**, Atchison, Kans., subsidiary of Rockwell Mfg. Co. **Robert J. Murphy** was named foundry superintendent.

H. Richard Alexander was made vice president of **Harvill Corp.**, Los Angeles, to head a group of company operations. He was vice president of Rosan Inc.

J. Philip Murphy was elected president of **Yuba Consolidated Industries Inc.**, San Francisco, following resignation of **John L. McGara**, president and chairman. Mr. Murphy was president of Judson Pacific-Murphy Corp., Emeryville, Calif., which was acquired by Yuba in 1958.

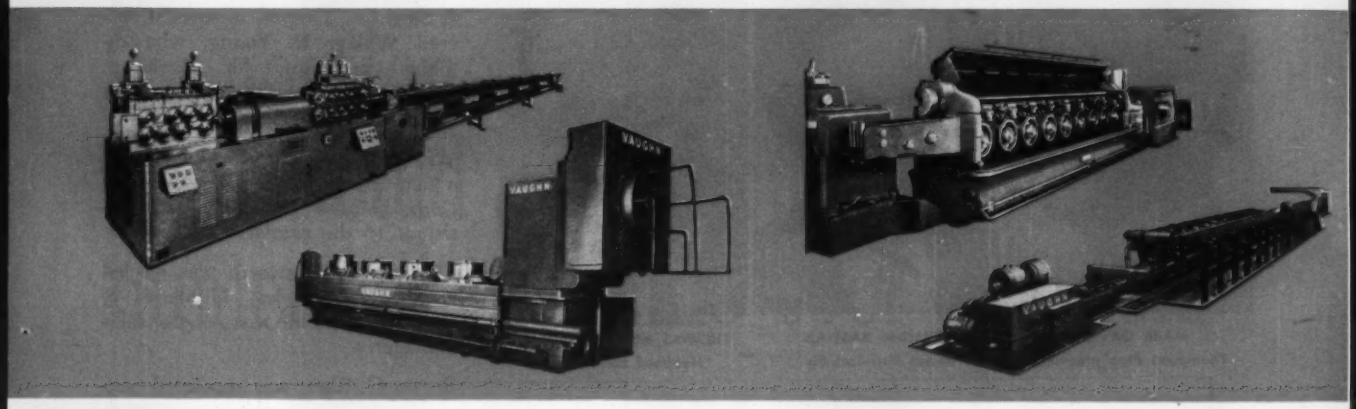
John D. Gum was made director of engineering for Photo-Optical Div., Monrovia, Calif., **Consolidated Systems Corp.**, a newly created post. He was assistant director of systems engineering at CSC.

Fostoria Corp., Fostoria, Ohio, named **D. E. Kralcvec** manager of electrical products sales, **R. W. Jeffery** manager of engineered products, and **E. W. Kuhn** manager of general products.

Winfield R. Scott was named assistant to the general superintendent, Operations Dept., **Weirton Steel Co.**, Weirton, W. Va., division of National Steel Corp.

Vincent D. Bates was named factory manager of **Oberdorfer Found-**

IF IT'S COLD DRAWN SEE VAUGHN!



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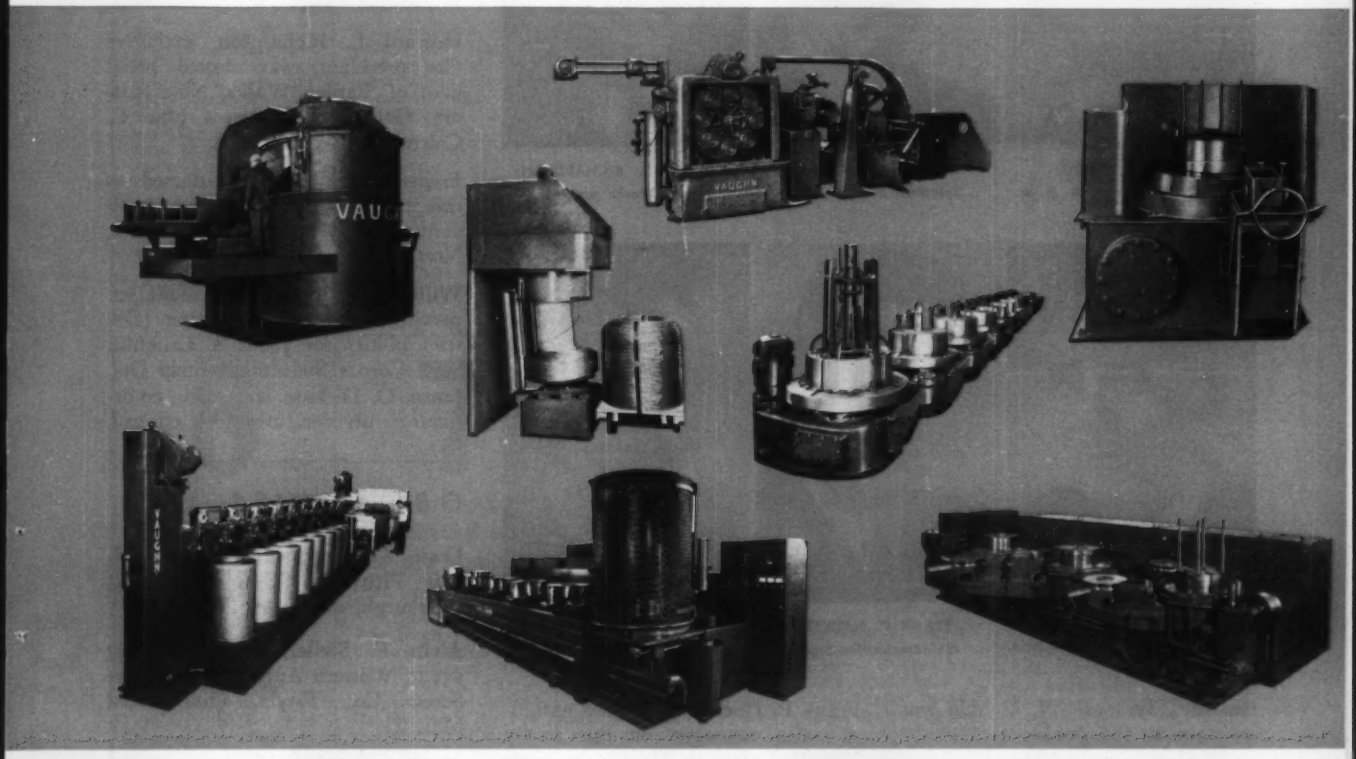

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Thompson Pipe president

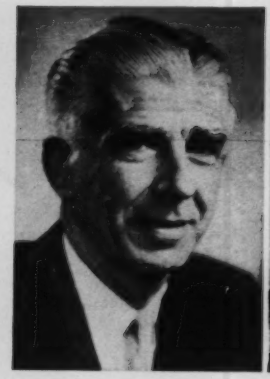
WILLIAM BASTIAN
heads Heli-Coil div.

THOMAS HOLLINGSWORTH
Hubbard sales v. p.

ROBERT G. RHETT
Kennecott Copper gen. p. a.

EUGENE E. BROKER
Sylvania Electric post

HOWARD L. RICHARDSON
Stanley Works president



EARL K. BROWNRIDGE
American Motors (Canada) pres.

FRANK P. HACKER
Calamari sales mgr.

G. R. ARCHER
joins CompuDyne Corp.

ries Inc., Syracuse, N. Y. He was assistant to the president.

Earl K. Brownridge was elected president of **American Motors (Canada) Ltd.**, Toronto, Ont. Executive vice president and general manager since January, 1960, he succeeds **Roy D. Chapin Jr.**, who was elected to the new post of chairman.

Frank P. Hacker was made national sales manager of the newly formed **Calamari Co. of America**, Addison, Ill., division of Da Prato Mfg.

G. R. Archer joined **CompuDyne Corp.** as general manager of its Process Control Div., Hatboro, Pa. He was chief engineer, Electronic Control Section, Budd Co.

S. Mark Davidson was elected president and treasurer, **Thompson Pipe & Steel Co.**, Denver, to succeed succeed **Walker R. Young**, who remains chairman. Mr. Davidson, with the company 26 years, was first vice president.

William Bastian was named to head a new Marketing Div. of **Heli-Coil Corp.**, Danbury, Conn. He was assistant to the president.

Thomas Hollingsworth was elected vice president-sales, **Hubbard & Co.**, Chicago. He was general sales manager.

Robert G. Rhett was appointed general purchasing agent of **Kennecott Copper Corp.**, New York. He succeeds **L. W. Shelton**, retired.

Effective May 1, **Eugene E. Broker** will become general manufacturing manager, Parts Div., Warren, Pa., **Sylvania Electric Products Inc.**, a subsidiary of General Telephone & Electronics Corp.

Howard L. Richardson, executive vice president, was elected president of **Stanley Works**, New Britain, Conn. He succeeds **John C. Cairns**, elected chairman.

Frederick R. Lack was named to the new post of senior vice president-research, **Sprague Electric Co.**, North Adams, Mass.

William F. Hopkins was made supervisor, production planning (Detroit plant) for **Jones & Laughlin Steel Corp.'s** Stainless & Strip Div. **James D. Dickson** was made co-ordinator, division inventory control.

OBITUARIES...

Donn D. Greenshields, 60, president, **Pittsburgh Screw & Bolt Co.**, Pittsburgh, died Mar. 28.

Alvin F. Steller, 59, purchasing agent, **Western Automatic Machine Screw Co.**, Elyria, Ohio, died Mar. 23.

Charles W. Boyle, formerly Pacific Coast sales manager, **Wheatland Tube Co.**, Philadelphia, died Mar. 23.

Herman J. Tonn, 83, vice president and cofounder of **Chicago Rivet & Machine Co.**, Bellwood, Ill., died Mar. 17.

9 questions you should ask about numerical machine tool controls

1

Has the system, through actual use, proven to be a money saver?

Many new controls on the market today have yet to be installed on their first customer application. However, Hughes numerical positioning controls have been successfully operating in customer plants for over a year and a half! One typical Hughes customer was able to cut tool costs by $3000 and reduce lead time by 50% on a run of 50 missile parts.

2

Is it competitively priced?

Many people are surprised that Hughes systems, with all their advantages, are often priced lower than competitive units.

3

How many machine axes can I control?

Hughes provides either two or three axis controls – in the same cabinet. And, with the Hughes system, you can purchase a two axis control now, and add the third later.

4

Are special skills required to prepare the tapes and operate the machine?

Not with the Hughes system. Anyone familiar with general machine shop practices can prepare the tapes and operate the machine after only two days training!

5

Can I get high accuracy – and, is that accuracy repeatable?

Hughes two-axis controls offer you repeatable accuracies of ±0.0002 inch with a resolution of ±0.001 inch. Adding the third axis, repeatable depth accuracies of ±.0005 with a resolution of ±0.001 inch can be obtained.

6

Will I need a great deal of service after sale?

Maybe you've heard about numerical control systems that require a lot of service. Not so when you specify a Hughes Numerical Machine Tool Control. Customers report that "up time" is over 95% – after a full year of operation!

7

Is the system transistorized for maximum reliability?

The Hughes Transistorized System is much less sensitive to vibration, shock and temperature fluctuation. Result: with Hughes transistorized circuitry you get higher reliability and minimum maintenance.

8

Is the tape reader fast and reliable?

Mechanical tape readers have two inherent disadvantages: they are relatively slow and they tend to deform the tape holes. Not so with photo electric tape readers – the type used on Hughes controls. They're extremely fast (eliminating need for costly electronic storage) and they do not injure the program tape.

9

Does the manufacturer have a reputation for standing behind everything sold?

Hughes gets an emphatic "yes" to this question. Hughes has built a reputation as a *world leader* in advanced electronics and has a world wide service organization.

Find out more about how Hughes Numerical Controls

can increase your profits. Write, wire, teletype (TWX INGL 4117) or call direct: Hughes Industrial Control Systems, Dept. No. 92-21, P. O. Box 90904, Los Angeles 45, California. For export information please write: Hughes International, Culver City, California.

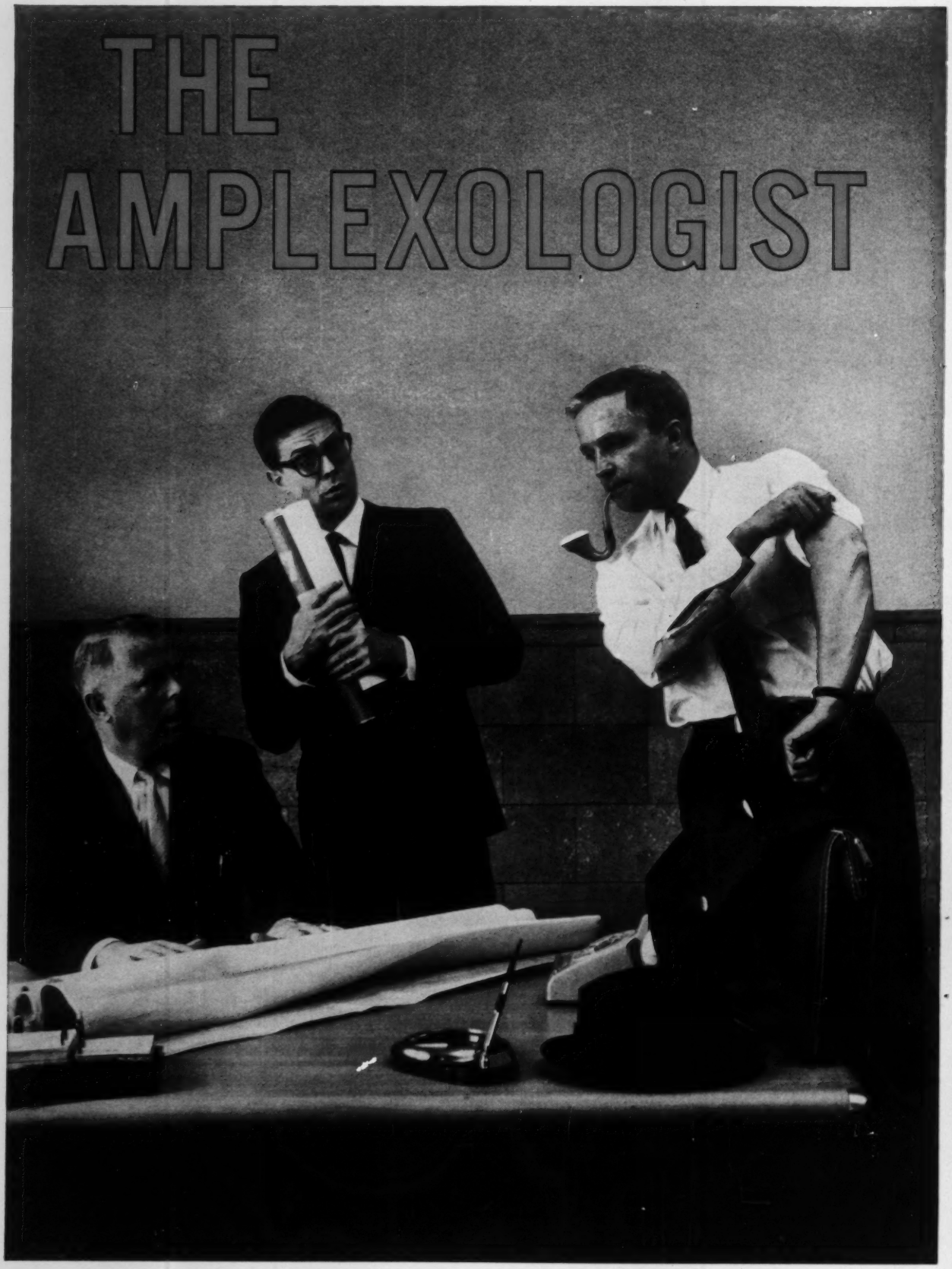
CREATING A NEW WORLD WITH ELECTRONICS

HUGHES

HUGHES AIRCRAFT COMPANY

INDUSTRIAL SYSTEMS DIVISION

THE AMPLEXOLOGIST

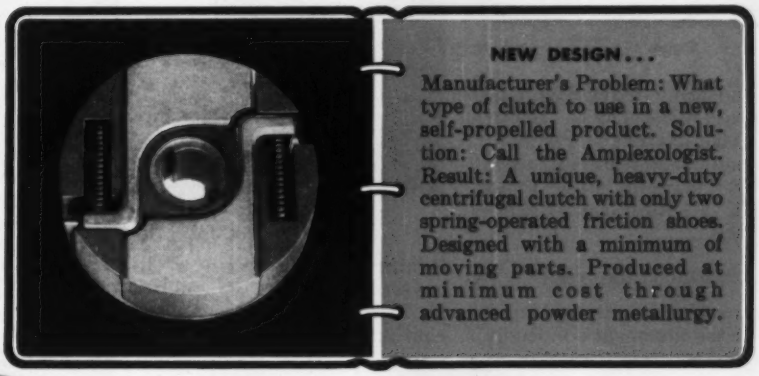


...ASKS FOR TROUBLE!

Funny thing. Many manufacturers get stand-off*ish* when you ask for an order. But when you ask for trouble they're very cooperative. Problems, they'll give you plenty of. Yet, according to the Amplexologist, a problem is the next thing to an order.

How so? Well, most manufacturing problems today revolve around cost and quality. How to keep one down and the other up. And that's the Amplexologist's specialty. Time after time he has replaced machined structural parts with precision powder metal parts that often cost no more than a rough casting and require no machining at all. Saves as much as 90%. Frequently improves product performance, too.

We're happy to report that the Amplexologist—by asking for trouble—has won many friends. Many customers, too. In fact, asking for trouble has helped make us the world's largest and most experienced producer of powder metal parts. Another reason leading manufacturers say: **When it comes to powder metallurgy, Amplex has the answer.**



NEW DESIGN...

Manufacturer's Problem: What type of clutch to use in a new, self-propelled product. Solution: Call the Amplexologist. Result: A unique, heavy-duty centrifugal clutch with only two spring-operated friction shoes. Designed with a minimum of moving parts. Produced at minimum cost through advanced powder metallurgy.

AMPLEXOLOGIST

AMPLEX

DIVISION CHRYSLER CORP., DETROIT 31, MICHIGAN

A CHRYSLER OILITE® PRODUCT

SCIAKY ELECTRON BEAM WELDING

Here's how you can combine precision research and practical production electron beam welding in one equipment installation

Whether your interest in electron beam welding processes is for highly precise research or practical production work—or both—your data should be complete with details on Sciaky machines. They are most simple and practical in concept and operation.

GUN DESIGN GIVES EXCEPTIONAL ELECTRON OPTICS

The Sciaky Electron Gun produces specific beam density previously possible only with accelerating potential higher than 100,000 volts. The Sciaky gun, entirely contained within the atmosphere of the welding chamber, will operate in any angular position. *Both* gun and fixture can be moved to any position within the chamber while welding.

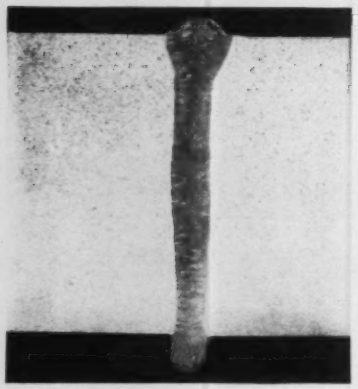


Figure 1

Advanced focusing design results in electron beam welds of 12 to 1 depth to width characteristics. Figure 1 shows a deep penetrating butt weld in type 304 stainless steel. Plate thickness is .5″. Note lack of heat-affected zone.

GUN AN INDUSTRIAL TOOL

The gun construction is simple and rugged. Precise alignment is inherent in design, and is not dependent upon assembly adjustments. If necessary, filaments can be easily and quickly replaced in less than five minutes. As shown in Figure 2, the Sciaky Electron Beam Gun is small and

Figure 2

compact. A simple spacer arrangement optimizes gun optical system throughout a wide range of output power without compromise of specific beam energy. As a result, the

Figure 3

Sciaky gun is optimized at current ranges of 250, 150, 100 and 50 MA. at 30,000 volts. Output power is continuously adjustable within each range.

EFFICIENT PUMPING SYSTEM

Evacuation of chamber to welding pressure is obtained within 3 to 10 minutes, depending on chamber size. Pumping sequence is fully automatic, and without any manual adjustment. Automatic safety devices insure trouble-free operation and full protection of system.

RADIOLOGICAL HAZARDS ELIMINATED

Low voltage (30,000 v. maximum) and highly refined chamber design eliminate x-ray hazards to operator, which are a severe problem with higher voltage equipment. As a result, the Sciaky low voltage system needs no costly shielding, even when welding at highest output.

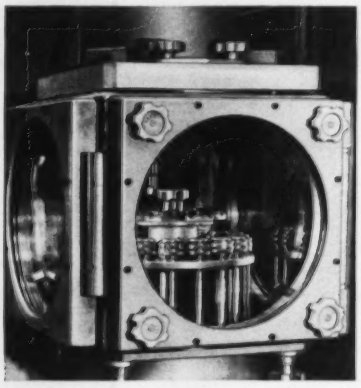


Figure 4

As shown in Figures 3 and 4, complete accessibility and visibility are provided by this latest Sciaky design. All sequence controls of the dial feed unit (Figure 4) are fully automatic. This production unit is being used to weld end-caps to tubes.

Regardless of your specific area of interest, you'll find the Sciaky combination of welding experience and electron beam technology is well advanced. Sciaky is Exclusive Licensee under Stohr, U.S. Patent 2,932,720.

81C8102

You can learn more about Sciaky Electron Beam Welding, fully automatic TIG and MIG Welding with modular or building block concept, and the newest in Bench Welding at the

A.W.S. Welding Show, New York Coliseum, April 18, 19, 20,
Booth 729

SCIAKY BROS., INC., 4909 WEST 67th STREET, CHICAGO 38, ILLINOIS • PORTSMOUTH 7-5600

Global Steel Struggle Spurs Capital Spending

THE AMERICAN Iron & Steel Institute predicts that world spending to improve and expand steelmaking facilities will increase in 1961. The estimate: $5 billion to $6 billion vs. an estimated $4.5 billion to $5 billion in 1960.

The institute attributes the increase to the intensifying world-wide competition in which a great many participating nations are striving to keep pace or gain a place in the steelmaking ranks.

The U. S. is expected to be the biggest spender by putting $1.2 billion into expansion and modernization this year. Since the iron and steel industry in the U. S. is in an advanced stage of development, heavy expenditures will be made for producing better quality steels to be used in homes, autos, farm equipment, other consumer goods.

No change is expected in the USSR's outlay which was $1 billion in 1960. The Soviets plan to slow their iron and steel production between 1962 and 1965 so they can put more money into agriculture and light industry.

Great Britain and the European Coal & Steel Community will probably spend about $1.1 billion. The estimate does not include expenditures by producers outside the Community's authority.

Japan's expenditures will probably hit $750 million, says the institute, while Austria, Canada, and India will spend nearly $500 million. Between half a billion and a billion dollars may be spent by other producers in Europe, Latin America, Asia, Africa, Australia, Red China, and elsewhere.

Over the next few years, the European Coal & Steel Community nations alone are talking about spending $900 million for rolling mills and $650 million for oxygen converters, blast furnaces, and sintering facilities.

New Department Created

Intensifying its drive to produce and sell refractory materials, Union Carbide Metals Co., a division of Union Carbide Corp., New York, has established a Refractory Metal Dept. under the management of D. H. Barbour.

Coke Facilities Expanded

The Pittsburgh Works of Jones & Laughlin Steel Corp. has put a new battery of 59 byproduct coke ovens into operation. Another 59 oven battery went into operation during 1960 and a 118 oven battery is scheduled for completion later this year. The expanded byproduct coke facilities will provide ample coke for the Pittsburgh Works's six blast furnaces, and some coke will be shipped to J&L's Cleveland Works. The new batteries feature four-divided, low differential ovens and rotating table charging cars, which permit rapid charging without smoke emission.

Tubing Distributor Named

Harvey Aluminum, Torrance, Calif., has appointed Tubular Service Corp., Springdale, Pa., and its Astell-Tubular Service Div., North Bergen, N. J., as distributors. The warehousing of Harvey Aluminum tubular products adds stocks of extruded and drawn aluminum tubing, pipe, and hollow bar to Tubular Service's line of products.

Glidden Invests Overseas

Glidden Co., Cleveland, has acquired a one-third interest in Hermann Wulfing Wings-Lackfabrik, a West German paint manufacturer. One-third interest was also purchased by AB Wilh. Becker, Sweden, a paint manufacturer and Glidden's licensee for the last ten years. The acquisition furthers Glidden's participation in expanding European markets and will benefit all three

WHEN YOU NEED HELP IN A HURRY—

Koppers coupling service cuts costly down-time

Not every coupling service need is an emergency. But it's the emergencies that really test a good organization. That's why Koppers maintains experienced field engineers and outstanding stock facilities throughout the country. In addition, if it's a Fast's Coupling you're replacing, we have a serial number and specific application history for every Fast's for easy reordering. And our modern manufacturing facilities have the extra capacity to lick an emergency for special requirements.

Example: A modern windowless bank in Georgia was able to open for business as usual only because Koppers flew in a completed replacement coupling for its air conditioning unit. Elapsed time . . . request phoned to Baltimore after 10 in the evening . . . coupling arrived before 7:30 next morning.

KOPPERS COMPANY, INC., 304 Scott St., Baltimore 3, Md.

KOPPERS

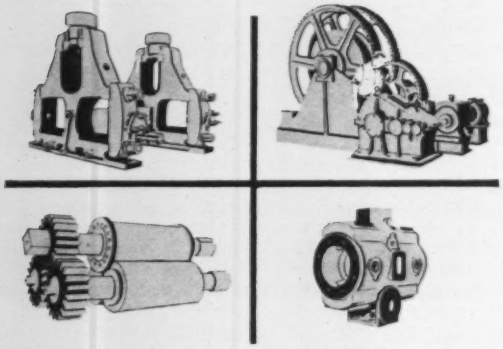
FAST'S COUPLINGS

Engineered Products Sold with Service

SERVICE FOUNDRY

Chances are that you have us in mind as specialists in marine components and sugar machinery. It's a fact that our reputation was built on serving these fields, and we continue to do a large volume in them. What we would like to tell you is that we've expanded our facilities over the years to the point of extreme capability in electric furnace steel castings of medium and high carbon content, semi-steels in our iron foundry, and aluminum, monel and the various alloys of brass and bronze in our non-ferrous foundry. Our machine shop is equipped with some of the largest and most diversified tools in the South—rounding out our complete foundry facilities.

Service Foundry would like to work for you. Your inquiry will bring a prompt, definite reply.



SERVICE FOUNDRY

416 ERATO ST. · JAckson 2-3836 · NEW ORLEANS 13, U.S.A.

a division of AVONDALE SHIPYARDS, INC.

companies through the exchange of technical information.

New Firm Holds Patents

Tyler Wayne Research Corp., Cleveland, has been formed by W. S. Tyler Co., Cleveland, and Fort Wayne Metals Inc., Ft. Wayne, Ind., to do research and development, hold patents, and provide licensing for a stainless steel wire process developed by the parent companies.

ChemTrac Corp. Formed

Baird-Atomic Inc. and Controls for Radiation Inc., both of Cambridge, Mass., formed a jointly owned subsidiary, ChemTrac Corp., to produce radioactive tracer chemicals for use in scientific and industrial research.

Bayley Ownership Changed

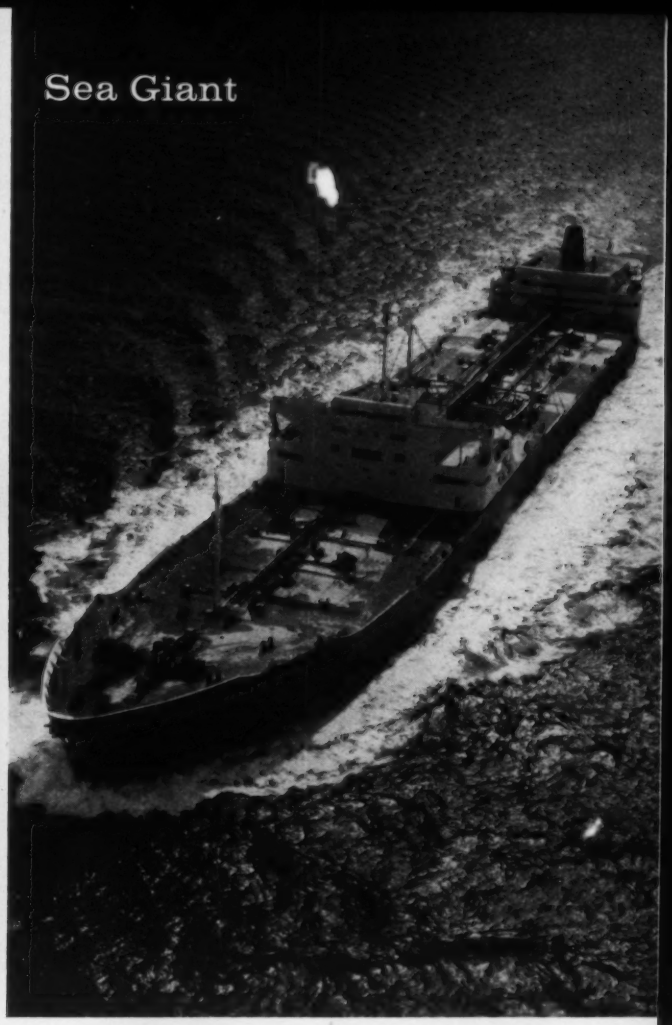
All common stock of Bayley Blower Co., Milwaukee, was purchased from Green Fuel Economizer Co., Beacon, N. Y., by a group of Bayley executives. New officers are Vance Smith, president; P. D. Persinger, vice president; and W. S. Davis, secretary. Bayley, a manufacturer of heating, air conditioning, and ventilating products, plans to move its New York functions to Milwaukee.

Austin Expands Abroad

Austin Co., Cleveland, has formed two new engineering and construction firms which are jointly owned with overseas organizations. The new companies: Austin-Anderson (Australia) Pty. Ltd., Sydney, Australia, and Austin-Graziani S. A., Buenos Aires, Argentina.

Hot Ions: 5.5 Billion° F

An experimental facility which may be capable of developing temperatures in billions of degrees is being constructed by Oak Ridge National Laboratory, Oak Ridge, Tenn. The $1.6 million project is part of a long range program to control the energy releasing fusion reaction for production of electric power. In the DCX-2, a "hot ion" injection system, electrically charged atomic particles are accelerated by high voltages before being intro-



When reliable welding comes first so do M&T Murex Electrodes

THAT HUGE TRACTOR is a mountain of earth-moving muscle capable of 67,000 pounds of pull. An average tractor is dwarfed by this monster: 23 feet long and weighing over 75,000 pounds with equipment. On its seven-roller tracks, it can claw into the earth, push huge boulders, maul tons of dirt.

THE PRINCESS SOPHIE is just as much a giant of the sea lanes. When loaded, it displaces 100,000 tons—more than any passenger or military ship afloat. The latest electronic equipment, a foam fire-protection system, a complete hospital and air-conditioned quarters make it one of the safest, most luxurious supertankers ever.

Another interesting fact about these two giants: both obtained the proper joint strength through welding with M&T Murex electrodes. It's interesting, but not unusual. You'll find that this brand is increasingly in evidence at demanding jobs everywhere. It represents one of the broadest lines in the industry: over 1000 types and sizes for virtually any type of application—as advantageous on the routine jobs as on the extraordinary ones.

To get the whole story on this outstanding line, call in your M&T welding specialist. Or write for your copy of the helpful M&T Murex Electrode Selector.

M&T

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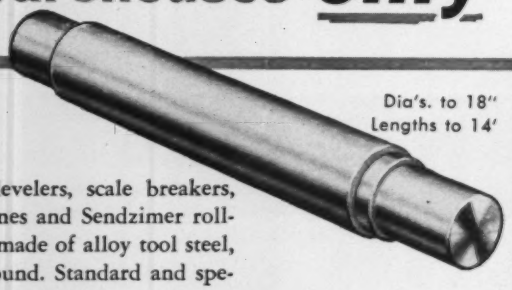
METAL & THERMIT CORPORATION, General Offices: Rahway, New Jersey

For STEEL MILLS

and warehouses *only*



"HILL ACME" ROLLS

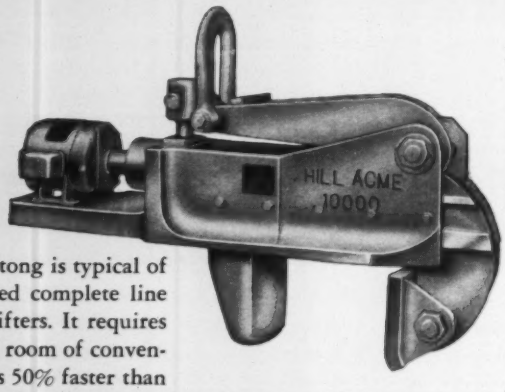
Dia's. to 18"
Lengths to 14'

Custom made for levelers, scale breakers, straightening machines and Sendzimer rolling mills. Precision made of alloy tool steel, heat treated and ground. Standard and special types.

"CLEVELAND" METAL CUTTING KNIVES

The product of forty years of experience in manufacturing alloy grade, metal cutting knives of all types for shearing hot and cold metals.

"HILL ACME" MOTORIZED LIFTERS



This vertical coil tong is typical of the newly designed complete line of HILL ACME lifters. It requires only 1/3 the head room of conventional tongs and is 50% faster than mechanical types. Gives a constant grip ratio regardless of wall thickness and can be prepositioned to eliminate damage to the coil. Available up to 80,000 lbs. capacity. Contact us for "C" hooks, Rack Lifters, Billet, Sheet, Plate, Bar, Ingot and Ingot Mould Lifters.

THE HILL ACME COMPANY

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MANUFACTURERS OF: "HILL" Grinding and Polishing Machines • "ACME" Forging Machines • "CANTON" Rotary and Alligator Shears • BAR-BILLET Shears MATERIAL HANDLING Equipment • "CLEVELAND" Knives and Shear Blades.

duced into the device. In this case, ions will be injected with an energy of 600,000 electron volts which, under certain conditions, is comparable to a temperature of more than 5.5 billion° F.

Overseas Agreement Made

Preliminary plans have been completed between Towmotor Corp., Cleveland, and Lansing Bagnall Ltd. of England for the manufacture of Towmotor products in England. Arrangements are also being made to manufacture and distribute Lansing Bagnall electrically powered fork lifts and industrial trucks in the U. S.

Black & Decker Buys Into French Firm

BLACK & Decker Mfg. Co., Towson, Md., strengthened its position in the European market by acquiring a minority interest in a French firm. The newest affiliate of the Black & Decker organization is Societe de Constructions Mecaniques du Dauphine, Lyons, France.

For nearly 40 years, Socomeda has manufactured and marketed a diversified line of portable electric tools in the European area. At its plant in Brezins, near Lyons, the company performs a complete manufacturing operation, turning out products designed for the handyman and for industry.

Socomeda is a subsidiary of Landis-Gendron S. A., which is owned by Landis Tool Co., Waynesboro, Pa. It has now begun manufacturing Black & Decker Micox and Micox-Isal power tool products.

Black & Decker, as well as being an operating company, is the parent corporation of an international manufacturing and marketing organization of 16 member companies. Commenting on its European operations, Robert D. Black, chairman, says: "We organized a Belgian subsidiary, Black & Decker (Belgium) S. A., at Brussels in 1957 . . . to render sales, service, and warehousing facilities in this important area. The Belgian subsidiary as well as Black & Decker Ltd., which manufactures our products

WHAT'S NEW IN TUBING?

Here's another ACIPCO "first"... ACIPCO CERAM-SPUN®, the ceramic mold process* that offers greater versatility in design, new concepts in economy.

WHAT THESE ADVANTAGES MEAN TO YOU! ACIPCO is not limited by equipment sizes. Now, for the first time, you can order the exact tube O.D. you need... from 2.25" to 50". As-cast lengths can vary from 4 feet to 20 feet, longer lengths are made by welding; and wall thicknesses range from .25" to 8". Furthermore, these tubes can be furnished with the exact combination of physical, chemical, and metallurgical properties required by your specifications.

THE RESULT: YOU SAVE MORE! No more unnecessary metal waste or excessive machine charges.

Too, ACIPCO's complete "under one roof" operations — including heat treating, machining and welding — eliminate the delays and additional high costs often involved in buying from multiple sources. Before you order another steel tube... first investigate the many advantages ACIPCO offers. Contact ACIPCO STEEL PRODUCTS, Division of American Cast Iron Pipe Company, Birmingham 2, Alabama.

*Patent applied for

ACIPCO CERAM-SPUN®
STEEL TUBING

Better Finishes Begin with
BIRDSBORO
Individualized Roll Service
is the big BIRDSBORO Extra...
Profit-Making Productivity
is the big BIRDSBORO Benefit
BIRDSBORO
CORPORATION BIRDSBORO, PENNA.
STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • ROLLS • ELECTRIC STEEL CASTINGS: Carbon, Low Alloy and STAINLESS STEEL

at Harmondsworth, England, will work closely with our new French subsidiary."

Chemical Firm Organized

Transelco Inc., Buffalo, a new firm headed by D. A. Grieco, purchased an interest in the U. S. Naval Ordnance Plant in Dresden, N. Y., for the production of chemicals used in metallurgical industries.

Kidde Forms Research Lab

Walter Kidde & Co. Inc., Belleville, N. J., has organized Kidde Electronics Laboratories to carry out its electronics research and development activities. The laboratories will concentrate in the fields of thermistors, power supplies, static relays, and contactors.

Ex-Senator Buys Firm

William A. Purtell, former U. S. senator from Connecticut, has purchased Electric Soldering Iron Co. Inc., Deep River, Conn. The company manufactures electric soldering equipment, irons, pots and guns distributed under the brand name Esico.

Winder Builds Air Base

For the last two years, Winder Aircraft Corp., Dunnellon, Fla., has been creating a new facility for developing, engineering, and manufacturing new products for the Space Age. On a 2500 acre tract, the company has built three, well-equipped, paved runways. Eventually, the facility will include an industrial complex of 12 buildings, a residential area for key employees, 15 miles of paved roads, and complete power, water, and sewage systems.

Mold Foundry Planned

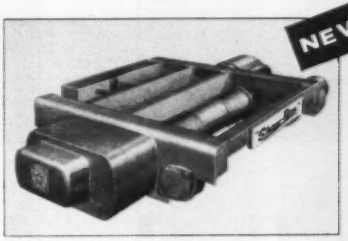
Indiana Harbor Works of Inland Steel Co., Chicago, plans to begin construction of two large projects this year with completion scheduled for 1963. An ingot mold foundry will be built with a capacity of 150,000 tons of molds a year (enough to supply the company's steelmaking operations at peak levels). The

(*Please turn to Page* 84)

Something New In Cranes

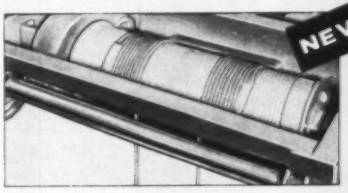
...at no extra cost!

New standards of quality and modern low headroom design are established in these Series "D" Cranes. They are built for regular industrial service — *yet have many of the advantages priced into the most expensive cranes.*



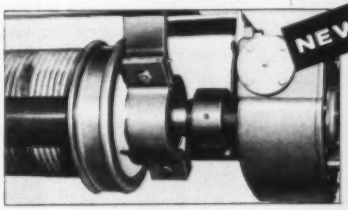
NEW **TROLLEY FRAME**

All steel, welded into a single unit and integrated with the hoisting machinery. Far stronger than the mounted monorail type of unit. Compact design provides high hook lift and close end approaches. Load and motor brakes positive acting; no back drift of hook. Trolleys available for a variety of speeds, lifts, and all standard currents.



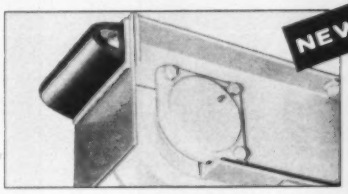
NEW **ROLLED STEEL DRUM**

A strong weldment — not a casting. Right and left hand deep-machined cable grooves provide true vertical lift at all times. No overlapping of cable on the winding drum. The drum and load sheaves have diameters at least 24 times the hoist rope diameter. Long cable life assured.



NEW **FLAME HARDENED WHEELS**

. . . on trolley *and* bridge are made of forged steel. All wheels are double flanged, with treads and flanges flame hardened to 550-600 Brinnel — nearly as hard as tool steel. Accurately machined to close tolerances, tapered bridge wheel treads assure easiest bridge movement. You can count on long wheel life.



NEW **RUBBER BUMPERS**

. . . tough, resilient. Take jolting impacts far better than wood — absorb shocks and take the strain off end trucks and bridge members. Other standard bridge features include rigid box section construction, heavy duty brake, motor and drive unit, and a checkered steel non-skid platform.

There's still more These Shaw-Box Series "D" Cranes are built in capacities from 3 to 25 tons. Models for floor and/or cab control. Spans to 80 feet. Pre-engineered components save you money and speed delivery. Write for catalog.

A MAXWELL MANNING & MOORE INC. TRADE MARK

SHAW-BOX CRANES

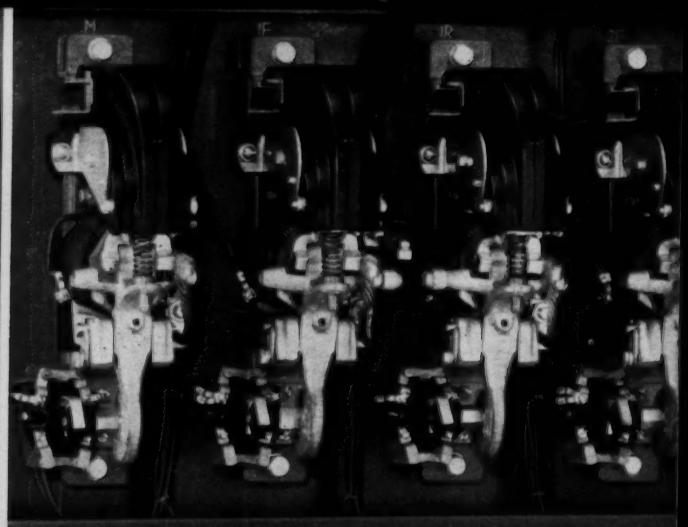
A product of

MANNING, MAXWELL & MOORE, INC.

Shaw-Box Crane & Hoist Division • Muskegon, Michigan

In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

NEW! **COMPACT 300 VOLT CONTROL RELAY** Space-savingest relay ever! So reliable it is permanently enclosed.



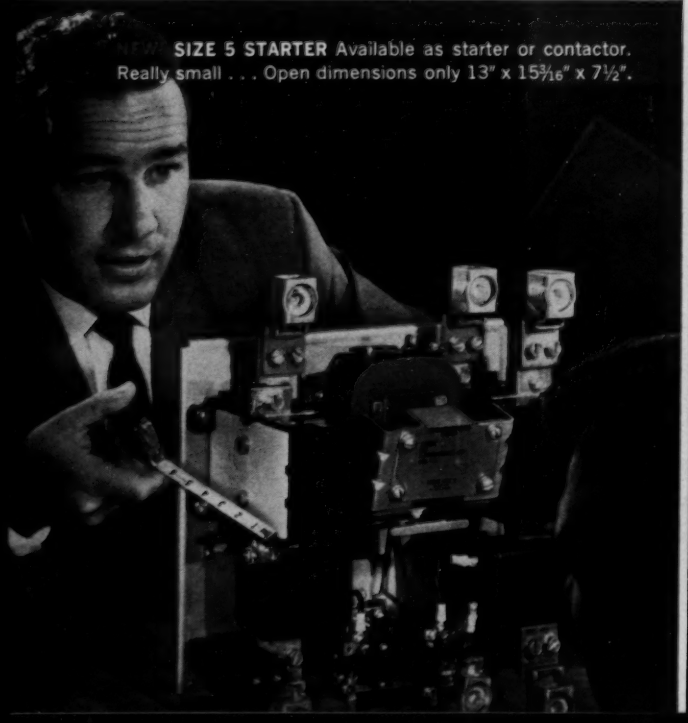
NEW! **D-C UNITIZED CONTACTORS.** For steel or slate panels, front or back wiring. Six sizes 25 to 600 amperes.

New from Cutler-Hammer

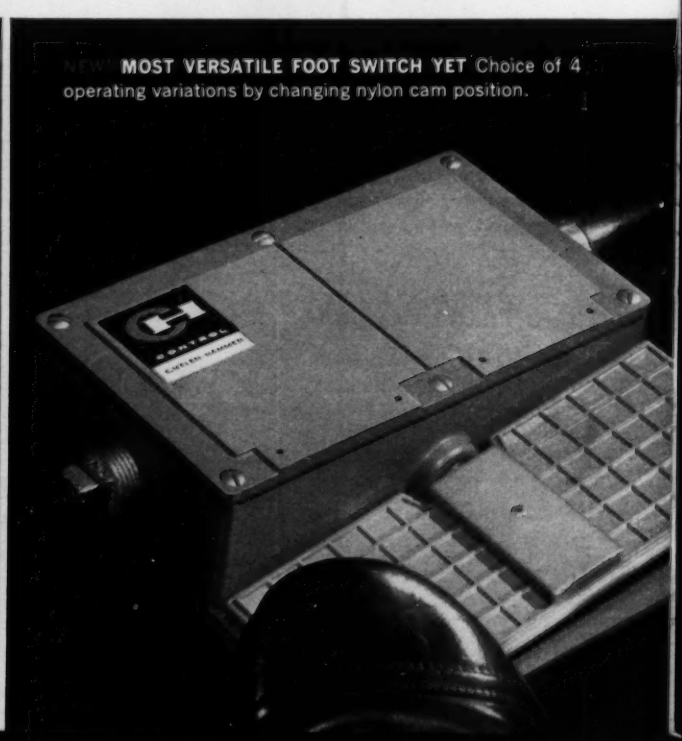
New products, new ideas to help your business now

The air is charged with new ideas at Cutler-Hammer . . . ideas and products resulting from our new production facilities, new engineering talent, new research programs, and most important of all—*a new desire to serve you better in the sixties.* Evidence of this vitality and what it can mean to you are these eight typical new products.

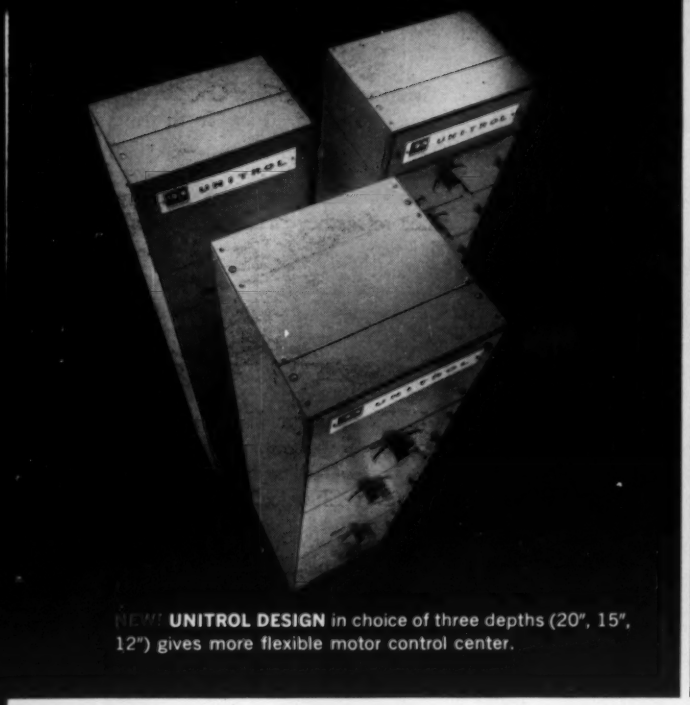
You can expect more news from Cutler-Hammer around the calendar. Give your Cutler-Hammer sales office or distributor a call. They're all charged up too—anxious to tell you more about *what's new at Cutler-Hammer.* For descriptive literature on any of these products, write Cutler-Hammer or call your nearest Cutler-Hammer distributor.



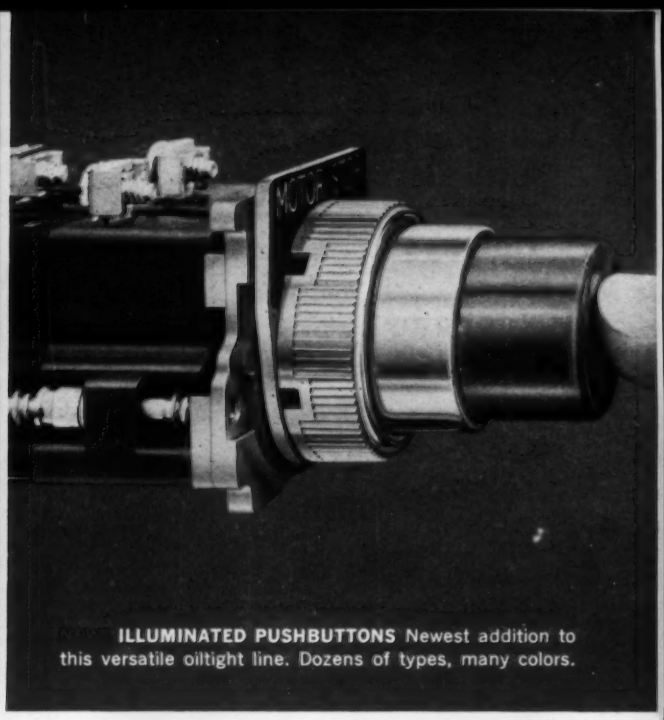
NEW! **SIZE 5 STARTER** Available as starter or contactor. Really small . . . Open dimensions only 13" x 15$\frac{3}{16}$" x 7$\frac{1}{2}$".



NEW! **MOST VERSATILE FOOT SWITCH YET** Choice of 4 operating variations by changing nylon cam position.



NEW! **UNITROL DESIGN** in choice of three depths (20", 15", 12") gives more flexible motor control center.



NEW! **ILLUMINATED PUSHBUTTONS** Newest addition to this versatile oiltight line. Dozens of types, many colors.

WHAT'S NEW? ASK...

CUTLER-HAMMER

CONTROL

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. • Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.

NEW! **SPACE-SAVING 00 STARTER** Takes 20% less space, costs 18% less than Size 0.

NEW! **MOST RELIABLE LIMIT SWITCH EVER** This oiltight switch outlasts others by far. Many operator options.

For Quality and Economy Use

MALLEABLE

For Service Contact...

CONNECTICUT
Connecticut Mall. Castings Co., New Haven 6
Eastern Malleable Iron Co., Naugatuck

DELAWARE
Eastern Malleable Iron Co., Wilmington 99

ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Iron Works, Moline
Moline Malleable Iron Co., St. Charles
National Mall. and Steel Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Albion Malleable Iron Company, Muncie Division, Muncie
Link-Belt Company, Indianapolis 6
National Mall. & Steel Castings Co., Indianapolis 22

IOWA
Iowa Malleable Iron Co., Fairfield

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

MISSISSIPPI
Mississippi Malleable Iron Co., Meridian

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

OHIO
American Malleable Castings Co., Marion
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
National Mall. and Steel Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

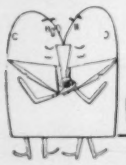
These companies are members of the Malleable Castings Council

(*Concluded from Page 81*)

second project is a new power and steam producing plant that will furnish one-fourth of the steel plant's power needs.

New Bearing Unit Formed

Mina Bearings Div. of Miniature Precision Bearings Inc., Keene, N. H., has been organized to produce and market a new line of low cost, miniature ball bearings. MPB's executive vice president, W. M. Scranton, says the company intends to broaden its market base, "particularly in nonmilitary markets where cost is the primary factor and ultrahigh precision and performance are less critical."



CONSOLIDATIONS

National Engineering Co., Chicago, purchased **Hydro-Blast Div., Guardite Co.**, Wheeling, Ill., a division of **American Marietta Co.** Hydro-Blast manufactures blast type cleaning equipment and a wet system for reclaiming foundry sand.

American Chain & Cable Co. Inc., New York, purchased all the capital stock of **Bancroft-Hickey Mfg. Co.**, Bristol, Pa., which will continue to manufacture grinding wheels and other abrasive products, operating as a subsidiary.

U. S. Freight Co. purchased **Smith Pipe & Steel Co.**, Phoenix, Ariz., fabricator and erector of structural steel and distributor of plumbing equipment.

Stockholders of **Midwest Piping Co. Inc.**, St. Louis, approved the sale of substantially all the company's assets to **Crane Co.**, Chicago. Former Midwest plants in Clifton, N. J., St. Louis, Los Angeles, and Houston will comprise the new Midwest Piping Div., Crane Co.

Conco Engineering Works Inc., Mendota, Ill., subsidiary of **H. D. Conkey & Co.**, purchased the business and manufacturing facilities of **Chicago Tramrail Corp.**, Chicago. Manufacturing of material handling equipment is now conducted as Chicago Tramrail Div., Conco Engineering Works Inc.

Ironton Fire Brick Co., Ironton, Ohio, was acquired by **North American Refractories Co.**, Cleveland. Ironton manufactures fire brick, plastics, mortars, cements, and other refractory products for industrial use.

ASSOCIATIONS

J. E. Spencer, Harshaw Chemical Co., Cleveland, was elected vice president of **Salesmen's Association, American Chemical Industry**, New York.

Copper Products Development Association, New York, authorized expenditures of $192,000 on five research projects to develop new or improved uses for copper.

American Institute of Steel Construction, New York, elected H. G. Lewis, Flint Steel Corp., Tulsa, Okla., president.

NEW ADDRESSES

Hubbard & Co., Chicago, will move its executive offices to 5401 W. Roosevelt Rd. in May.

Graver Tank & Mfg. Co., a division of **Union Tank Car Co.**, has moved its executive offices to 35 E. Wacker Dr., Chicago.

Cardair Div., Marmon-Herrington Co. Inc., has moved to new headquarters at 510 Indianapolis Ave., Lebanon, Ind.

NEW PLANTS

Conforming Matrix Corp. has moved to a new plant at 830 New York Ave., Toledo 11, Ohio.

Press Automation Systems Inc. moved into its new plant at 3840 E. Outer Dr., Detroit 34, Mich.

Modine Manufacturing Co., Racine, Wis., will build a 30,000 sq ft production plant which will be ready for occupancy this fall. Grading has been done to allow for an eventual building of 170,000 sq ft.

Tool and Hardware Manufacturers Use Malleable for the Parts They Guarantee...

"Guaranteed Against Warping or Breaking" is the seal of quality often found on tools and hardware made of Malleable iron. Frequently Malleable components are guaranteed while the other materials in the same tools are not.

Proven performance superiority has induced many tool and hardware manufacturers to switch to Malleable castings so they, too, can guarantee their products. At the same time, they often reduce their costs. How? Because Malleable provides more strength per dollar than any other metal; Malleable is the most machinable of all ferrous metals of similar properties; Malleable is truly outstanding for its toughness, ductility, castability and corrosion resistance. While Malleable's natural appearance is attractive, a wide variety of finishes can be applied for added customer appeal.

Improve your products by using Malleable castings. Check with any Malleable producer that displays this symbol —

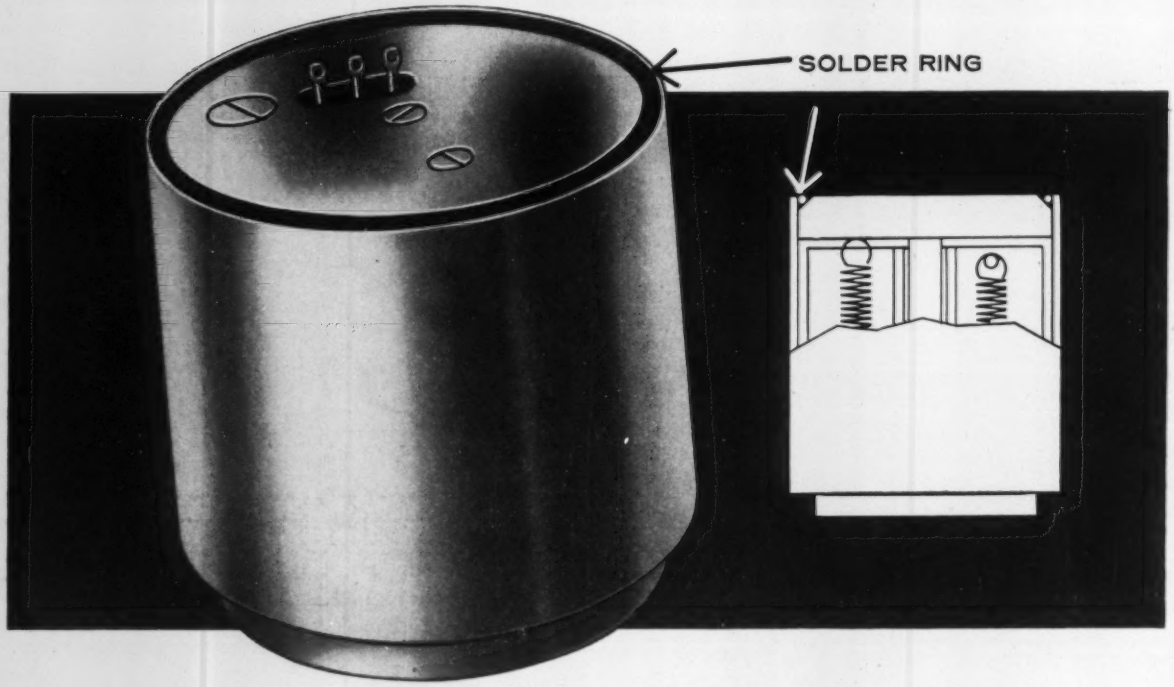
MEMBER
MALLEABLE
CASTINGS COUNCIL

Profitmaking Ideas are yours free in our Data Unit No. 114, available from any member foundry, or Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

The manufacturer of this unit converted his entire line of machinist vises to Malleable... then guaranteed them against breakage. Not one claim has been made in three years!

Precision soldering 7 Times Faster...

with TOCCO Induction Heating*



When G. M. Giannini and Co., Inc., Pasadena, California, switched from old-fashioned methods to TOCCO Induction Heating they increased production of these high-precision accelerometers from 4 to 30 per hour—with a commensurate *decrease* in production costs.

Here's what a Giannini official has to say about the TOCCO installation: "Prior to using TOCCO for this purpose, we had tried soldering irons, normal torches, resistance sealing, and even threaded screw fittings, with uniformly poor results. Essentially, the TOCCO unit has permitted us to build, in production quantities, oil-filled hermetically sealed units that could not be produced in any other way."

Whether your production bottleneck involves soldering, brazing, heat treating or heating for forming it pays you to investigate TOCCO as an economical way to do it better, faster and at lower cost.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today—**NEW FREE Bulletin**

The Ohio Crankshaft Co. • Dept. S-4, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Brazing and Soldering".

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Position_____

Company_____

Address_____

City_____ **Zone**____ **State**_____

Technical Outlook

THICK TO THIN—Engineers at Norair Div., Hawthorne, Calif., Northrop Corp., have successfully welded 0.001 in. stainless steel foil to 0.030 in. sheets with a tungsten, inert gas (Tig) technique, using an argon shield. Trick is to turn a 0.030 in. edge on the foil to match sheet thickness, says Northrop. A must: Precision tooling.

WELDING ADDITIVES—"The addition of alloying elements during welding may be practiced to some extent in joining practically all metals," states George E. Linnert, supervising research welding metallurgist, Baltimore, Armco Steel Corp. He foresees alloy additions in filler wire, powdered metal, metal plating, shielding gases.

NUGGET GRAINS REFINED—A technique announced by Armour Research Foundation of the Illinois Institute of Technology, Chicago, employs a magnetic field in conjunction with a gas-shielded arcwelder. Purpose: To refine grain size in weld deposits. The magnetic field produces a stirring action in the molten metal, promoting weld cleanliness, probably interfering with growth during nucleation, thinks Armour.

BETTER BACKING FOR WELDS—Steel shot coated with a thin film of baked aluminum paint provides a superior weld backup material, says Battelle Memorial Institute, Columbus, Ohio. Composition of the shot should resemble that of a weld made with an MIL 230-16 electrode. The technique will be described at next week's welding technical sessions of the American Welding Society, New York.

METAL TRENDS—Heard at the Western Metal Congress and Exposition, Los Angeles: "Materials are a limiting factor in constructing new machines and devices . . . genuine concern is often expressed about the slow rate of progress in materials science"—Prof. E. R. Parker, University of California, Berkeley, Calif. "Specialty metals in forging call for more complex fabricating techniques, increasing costs"—John Luchok, Wyman-Gordon Co., Worcester, Mass. "It is becoming harder than ever to hold heat treated metal parts to size and geometry. The trend to higher strengths and lower tempering temperatures make corrections even more difficult"—R. H. Lundquist, California-Doran Heat Treating Co., Los Angeles.

GIRTH WELDS FOR PIPELINES—Engineers from Battelle Memorial Institute, Columbus, Ohio, next week will unveil data about an automatic process for girth welding of steel pipelines. Details will be presented at the 42nd annual technical sessions, American Welding Society, New York. Developed in conjunction with Esso Research & Engineering Co., New York, a subsidiary of Standard Oil Co. (New Jersey), the machine will be built by Air Reduction Co., New York. Such devices will handle pipes from 4 in. to 36 in. in diameter at speeds up to 55 ipm with single pass welds in 5/16 in. walls, says Battelle.

ROCKET STRENGTH IMPROVED—Ausforming, the Ford technique of thermomechanically strengthening alloy steel, can increase the strength of rocket casings enough to bring a 21 per cent cut in the weight-to-payload ratio, says Stuart T. Ross, Aeronutronic Div., Newport Beach, Calif., Ford Motor Co.

OUT-OF-THIS-WORLD BANG—Explosive forming will be employed to form and size a metal dome 40 ft in diameter, says Aerojet-General Corp., Downey, Calif. It attributes its ability to handle such sizes to rapid advances made possible by a $3 million investment in facilities and research.

1000° F PLUS BEARINGS—Experimental bearings made of unusual alloys have been run above 1000° F without normal lubrication, states SKF Industries Inc., Philadelphia. Materials employed include carbides and ceramics in addition to the alloys, states Thomas W. Morrison, director of engineering and research.

42nd Annual Meeting & Exposition

INTERNATIONAL AIM:

Simplify, Standardize Welding Practices

• DECISIONS on standards and specifications that are expected to be made at meetings of the International Institute of Welding this week in New York could lead to "bolder designs, lighter construction, and greater economy."

That's the opinion of Clarence E. Jackson, vice president of the American Welding Society and associate manager, electric welding, Linde Co., a division of Union Carbide Corp., New York.

He cites one benefit of international agreements: "They will ease many problems involved in exporting equipment, structures, or machinery."

Other important discussions and recommendations will involve brazing, several new welding processes, standards for radiographic and ultrasonic inspection, rules for stress relieving, design of pressure vessels and boilers, quality of steels, and education, says Fred Plummer, national secretary, American Welding Society, New York.

• The IIW, started in 1948, meets four days each year to develop more workable codes and standards and to help correlate work along those lines here and abroad. Its recommendations are turned over to the International Standards Organization.

European research people tend to be more individualistic than their U. S. counterparts, says Mr. Jackson. As a result, codes, standards, and specifications have varied widely from one country to another, making it more difficult (and expensive) for firms to export welded products. Much progress has been made through the International to make such standards more uniform. One reason: More opportunity for the free exchange of welding data and ideas on such subjects. Foreign and domestic welding experts find it easier to learn about the major problems facing welding firms which want to export.

The interrelationships in the International have brought to light other approaches which may aid U. S. welders, believes Mr. Jackson. Take design. The Germans plan weldments as light as possible, later strengthen weak points which show up in testing or service. We, on the other hand, are prone to build everything heavier than necessary, often don't consider lightening a structure. Weak points are promptly "beefed up," but adequate sections are seldom checked to see if they might be lightened. Result: A heavier, more expensive weldment than the German counterpart.

• U. S. participation in the International has broadened our concept of how much the Europeans lead in welding education.

Formal welding education gets extensive government and industrial backing in foreign countries. Sweden, for example, has a school exclusively for welders of railroad rails. More than 200 operators have been trained.

In Russian and other European approaches, training is a government concern; here, it is left to the attention of companies and industries, states Mr. Jackson. A German welding engineer is a specialist who got his knowledge from the German Training & Testing Institute. He is responsible for all welding work, even product quality. In some cases, no construction drawing of a weldment can pass through the shop unless the welding engineer has signed it, points out Mr. Jackson.

The Russians are aiming at 50 per cent automatic welding.

Although the meetings are closed, experts and observers will attend, states Mr. Plummer. No technical papers are given at the International, but those who attend the technical sessions next week at the Hotel Commodore will hear presentations by 16 International delegates.

OUR GOALS:

"We are searching continuously to find ways to exercise greater control of an electric arc so we may increase welding speed and deposition of metal. The rate of metal deposited has doubled in the last ten years. We should be able to double it again by the mid-1970s"

A. F. Chouinard, president, AWS; director of research & development, National Cylinder Gas Div., Chemetron Corp., Chicago

18,000 Expected to Seek Welding Ideas, Shortcuts

• MORE THAN $3 million worth of equipment will be exhibited, some of it for the first time, during the international welding exposition and convention in New York, Apr. 17 to 21. The number of exhibitors exceeds 100.

One initial showing: A gas shielded counterpart of the electroslag welding method for joining extra-thick sections of steel (see Page 105).

Foreign firms (two of them) will exhibit for the first time. Some equipment made abroad by U. S. companies will be shown.

The convention's international aspect is one reason cited for predicting a record attendance of 18,000. The general assembly of the International Institute of Welding will hold its first U. S. meeting this week. Sixteen foreign authors will present papers at next week's technical session. They are expected to give American participants a clearer insight into what their European counterparts are doing. Delegations will represent 27 nations.

• Participants in 22 technical sessions will hear more than 70 presentations of late information on advanced welding techniques.

The featured spot—the Adams lecture—also has a foreign flavor: H. Granjon, Institut de Soudure, France, will present his Studies on Cracking of and Transformation in Steels during Welding.

Another highlight: An open meeting at 2 p.m. Wednesday, Apr. 19, at the Commodore Hotel will feature the latest information on joining missiles and rockets. Panelists who will present details include representatives of U. S. Steel Corp., Pittsburgh; A. O. Smith Corp., Milwaukee; General Electric Co., Schenectady, N. Y.; Armour Research Foundation, Chicago.

The educational series of lectures will be conducted by a Russian, N. N. Ryalkin, who will explain the USSR viewpoint on heat sources, heat flow, and heat effects.

Contributors from overseas are expected to attract those interested particularly in brazing, gas shielding mixtures, fatigue evaluation, pressure vessel design, hydrogen effects in arcwelds, brittle fractures, and Russian information on electroslag welding.

Participants will also note that authors' attention is predominantly centered on arcwelding. One author will describe brazing sandwich structures made of columbium alloy.

• Last year's improvement in sales by the welding industry at a level somewhat above that of metalworking generally has stimulated enthusiasm for the show.

For example, sales in 1960 of welding equipment and electrodes chalked up an estimated 20 per cent increase over the preceding year.

Apr. 17 to 21
42ND ANNUAL MEETING
American Welding Society
Hotel Commodore, New York
Technical sessions held in conjunction with the American Institute of Electrical Engineers

Welding Show Exhibits
New York Coliseum
Tuesday,
10 a.m. to 10 p.m.
Wednesday,
10 a.m. to 10 p.m.
Thursday,
10 a.m. to 6 p.m.

Are You in Step

• **"MOST METALWORKING managers simply are not keeping up with progress in welding technology. Too often, they are passing up prime opportunities to cut costs and improve quality."**

In a poll by STEEL editors, both the experts who make and those who buy welding equipment have agreed with that statement. In pointing up shortcomings, three major points are cited most frequently: 1. Abuse of good design principles. 2. Failure to consider, study, or adopt new welding techniques. 3. Many of those who do adopt new techniques fail to follow through. (See "Ten Ways to Boost Your People's Efficiency," STEEL, Jan. 2, p. 92.)

• **Management must put more effort into proper design to get maximum benefits from proper tooling, says A. E. Carter, vice president-manufacturing, Worthington Corp., Harrison, N. J. Modern welding techniques are important to this new thinking.**

"We have invested and spent more than $1 million in the last seven years in welding research and employed a group of top rated experts to find ways of improving welding applications. Economic savings haven't been our only benefit—in many instances, we have been able to achieve quality levels formerly thought unattainable," states Mr. Carter.

Worthington puts much emphasis on weekly meetings of top key people (the manufacturing manager down to shop superintendents). They work out design modifications for improving product compatibility with present and new welding processes.

John Mikulak, Mr. Carter's assistant in charge of the welding program, cites a recent example. Worthington makes heavy duty, truck mounted concrete mixers. An earlier model weighed 7600 lb. Redesign brought about by committee action cut the weight 1500 lb. Further design changes already in the works cut that another 1100 lb. Total reduction: 34 per cent. Users can now carry an additional ½ cu yd of concrete and earn another $7 to $8 per load in a unit that is more reliable than previous models.

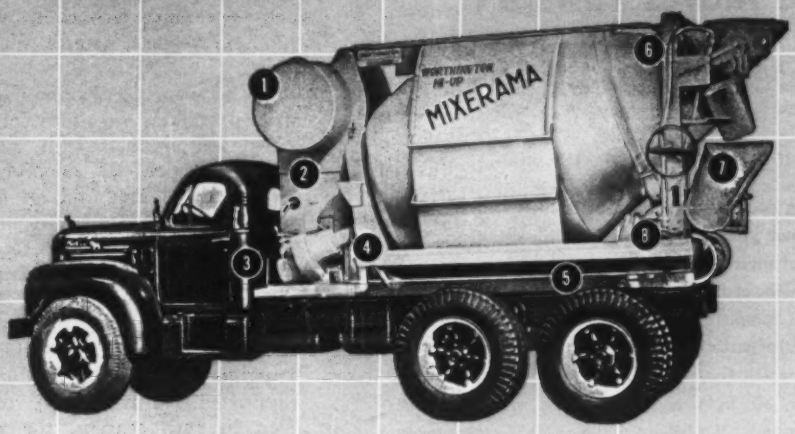
• **Welding is no longer an isolated joining process. The designer must be a mental gymnast who considers metal, stresses, configuration, and joining method simultaneously.**

Experts who review designs for other firms say that a common problem is failure to take full advantage of metal strength (see Page 88, International). Another area for improvement, some believe, is the designer's ability to adapt pressings, castings, forgings, and plates into a system which improves function and cost.

The ten check points proposed by Lincoln Electric Co., Cleveland (Page 91), emphasize the importance of considering a production item as if you had never made it before. One sound approach is the design based on loading only: The designer simply identifies the value and type of load, then designs strictly for strength or rigidity along the lines determined by the analysis.

Welding firms like to cite the Axelson lathe, designed and built by the Axelson Lathe Div., Clearing Industries, Chicago, U. S. Industries Corp. It is said to be 18 times more rigid than its previous counterpart, more flexible (the power, gear train, and head unit is removable), and could stand two or three times the rated horsepower without significant change in ac-

. . . cut weight, improved quality with these changes—



1. Tank lightened; load moved forward.
2. Tank support lightened.
3. Cab moved to shift load forward.
4. Pedestal lightened, redesigned for easier fabrication.
5. Running board lightened.
6. Lighter tube replaces heavy support.
7. Chutes lightened by change to high strength steel — abrasion resistance increased.
8. Pedestal redesigned, lightened.

with Welding Progress?

curacy. Despite added features, the price has been kept competitive.

Some equipment makers have elaborate technical facilities that offer a fast, comparatively easy way to review welded designs.

"The specialist is on the way out," say welding experts at Westinghouse Electric Corp., Pittsburgh. "He is seldom able to see all angles of a problem."

One solution: Train your own man. Most major firms like Lincoln Electric Co., and Hobart Bros., Troy, Ohio, maintain well-equipped technical schools. Howard Carey, the Hobart School director, for example, conducts five day courses designed for key management personnel. His equipment includes 120 welding stations on 80,000 sq ft of floor space, a 400 seat auditorium, x-ray equipment, plus lecturerooms and classrooms.

Equipment makers also run production samples for firms to determine quality of design, optimum welding methods, and develop supporting data.

• A great deal of emphasis is being placed on semiautomatic welding by equipment makers. They say such an approach has enormous po-

Checklist for Welding Designers

1. If you are redesigning, look at your product as though it had never been built before.
2. Does the design fully utilize all the potential of the metal?
3. Are you taking full advantage of material shortcuts? (Consider high strength steels, composite designs.)
4. Is the design based on past ideas that were controlled by the requirements of older processes?
5. Consider all aspects simultaneously—metal, welding method, size, weight, configuration.
6. Look at the specifications. Ask yourself: Do I really need a weld this good? Will fewer, smaller welds do the job? (Also consider high stress areas, low stresses, appearance, leakproofness, quality.)
7. Are you thinking of your welding operations in terms of seconds?
8. Double check your specifications with a reliable source. (Authorities tell STEEL that due to competitive pressures, ASTM, AWS, ASME and similar professional societies are approving code changes every six months.)
9. Are you looking at fitup? (Closer tolerances increase welding speed and quality.)
10. Have you done as much as you can to combine several parts into one formed piece to reduce the amount of welding?

Source: Lincoln Electric Co.

Welding Moves Toward 'Integrated' Marketing

● **THE TREND in the marketing of welding equipment is toward the sale of an integrated package by one company, believes Westinghouse Electric Corp. Traditionally, users buy piecemeal from several suppliers.**

Westinghouse's welding department at Buffalo seeks to keep up with the trend by: 1. Designing its equipment in complete packages as well as easy-to-handle modules. 2. Developing an over-all marketing plan for its welding customers.

Says General Manager R. C. Lipps: "Too many customers buy welding equipment piecemeal. That may seem all right until you (see) what (can) be achieved with fully integrated equipment. We believe that a welding system ought to be designed from power source right down to the material you are welding."

The concept is finding expression in Westinghouse's next step: The manufacture of its own welding wire. (Plans for plants are already being discussed.) In addition, its research laboratories in Pittsburgh have come up with a formula for what it claims is a more easily welded stainless steel.

"The trend is away from the specialty man," continues Mr. Lipps. "He can't see the whole picture." He gives magnesium welding wire as an example. "Some diameters being offered are simply unworkable in commercial equipment. Users often have to buy special modifications just to use the wire."

● **Several major problems are unsolved:**

1. Industrial customers need easier access to short term capital to finance new equipment. 2. Specialty welders need a faster method than tungsten, inert gas shielded arc (Tig). The consumable electrode (Mig) is faster, but so far it hasn't been universally accepted for stainless. 3. Who pays for engineering? Companies are often handicapped in bidding because so much precontract engineering time is involved.

● **Westinghouse sees several trends in welding equipment and methods.**

The arc spotwelder is definitely headed for big things. Latest equipment will put down 1200 spots an hour. Quality is no problem since operators can check quality visually.

Mr. Lipps believes that much welding progress will be concentrated in the gas shielding areas. His department is looking at the flux cored wire-gas combinations because they can lay down large quantities of metal. But such systems seem to be only interim methods until the real potential of gas shielding is made available through new methods, he believes.

Mr. Lipps also suggests: "Watch the plasma jet. It offers a real solution in cutting heavy aluminum and stainless steels."

tential that hasn't been tapped by the bulk of medium and small shops.

Here are two examples cited by Westinghouse which support that contention:

The Buffalo Control Div. makes a variety of angle reinforced, sheet metal cabinets to house electrical switch gear. They were formerly welded with E6013 (manual) electrodes which cost about 20 cents a pound. Today, the units are welded with small, semiautomatic units (West-ing-Guns) which employ carbon dioxide shielding and self-contained spools of electrode wire 0.035 in. in diameter (cost: $1.20 per pound).

"In spite of the sixfold increase in electrode cost," says Westinghouse, "we are saving $2250 per gun per year (12 are in operation). That is phenomenal. The higher deposition efficiency, elimination of slag and spatter, and excellent surface appearance also contribute to the improvement," states Westinghouse.

Second example: A manufacturer of steel tubular furniture formerly joined his products with manual, stick electrodes. By adopting the semiautomatic gun and an argon-oxygen shielding mixture, it was able to cut labor 25 per cent, increase production 285 per cent, and cut the cost of each chair 80 per cent. Because welding time was reduced so drastically, distortion and straightening have been reduced or eliminated. No overtime is required even in rush seasons, the manufacturer claims.

● **Management followthrough insures full utilization of semiautomatic equipment.**

Such action involves: 1. Checking the plant regularly to make certain that new equipment is given a fair trial. 2. Co-operating with venders to design and incorporate equipment modifications to fit needs.

Venders and buyers of welding equipment are aware of a basic technological struggle between proponents of the conventional manual or stick electrode and the semiautomatic methods. It is true that the manual electrode still accounts for perhaps 70 per cent or more of the market (depending on whether you measure pounds or dollars). One of the principal reasons, say authorities, is that it is much simpler to add a conventional welder to handle new business. Another reason: Inertia of operators. They tend to fight new ideas and faster production methods that could reduce labor requirements.

Caterpillar Tractor Co., Peoria, Ill., has a firm policy of following up new production methods. It has often commented on the effectiveness of semiautomatic and automatic devices. Here's what Paul D. Hartzell, manager of metallurgy and materials, has to say: "We have consistently worked with venders to develop reliable equipment for semiautomatic and fully automatic arc-welding."

Mr. Hartzell sees many unsolved problems, but he points out that many Caterpillar people are mem-

bers of committees for specifications and codes. Purpose: To emphasize the user's viewpoint on consumable welding supplies and techniques.

Selecting a New Technique

In investigating and selecting an appropriate welding technique, STEEL's survey brought out that potential buyers have much to gain from an open mind. J. J. Chyle, director of welding research, A. O. Smith Corp., Milwaukee, says: "Buyers should try new ideas more quickly. Automobile companies, for example, are fast to accept new approaches. You no sooner get a new idea started in their plants than they are bothering you with questions on other applications." Mr. Chyle would like to see more of that in other areas of industry.

"Welding has graduated from the technician and the trial and error method," says Mr. Chyle. "What was once an art is now a science. Example: The electron beam weld. It's founded on basic scientific principles. It is inconceivable that such a method could have been developed on the 'art' basis alone."

• What are the most important welding techniques? Respondents emphasize that automatic and semiautomatic methods have the greatest potentials for process improvements.

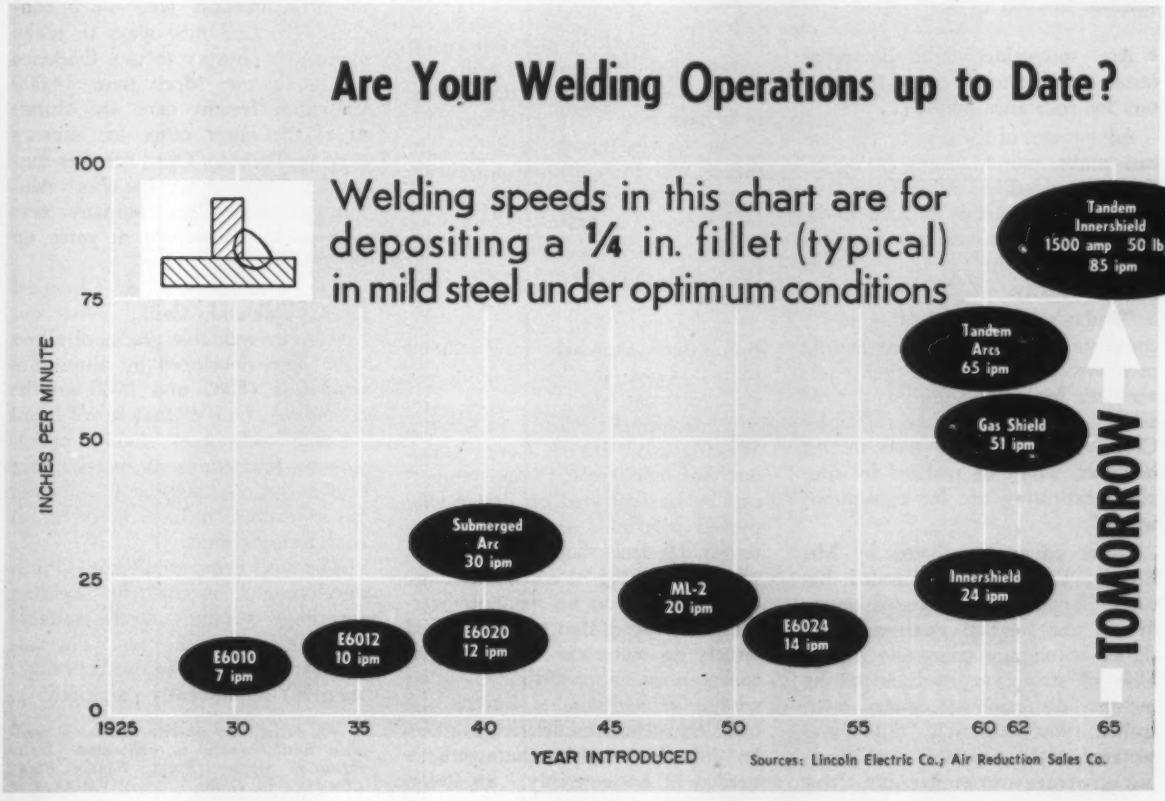
Experts agree on the importance of automatic and semiautomatic equipment as opposed to older manual methods. The new techniques are not a cure-all, but some people seem to ignore those who emphasize the trend from the stick electrode. A few even predict that industry will switch from its present 70 per cent use of stick electrodes to 50 per cent automatic-semiautomatic within five years.

To support that contention, equipment makers like A. O. Smith and Westinghouse point out that the newer processes can pay for themselves fast enough to meet stiff corporate amortization requirements. Mr. Chyle states that half the capital equipment costs for jobs attempted at A. O. Smith with CO_2 shielded processes can be written off in less than one year.

If you need to deposit large quantities of metal (heavy plates, for example), nothing yet approaches the superiority of the sophisticated submerged arcs, states Omer Blodgett, design consultant, Lincoln Electric Co. Main drawbacks are the powdered flux and the flat downhand position.

Among the semiautomatic processes, you will find proponents of straight gas shielded types and those who prefer some kind of gas-flux combination (cored wire, for example). Such systems can weld in any position, at speeds sometimes faster than an operator can move his torch (CO_2 shielded welding is being done at nearly 300 ipm on 0.120 in. mild steel).

Another suggestion: For light metal, consider the comparatively low temperature, small wire methods (Short-Arc, Dip-Transfer, Microwire, for example). Here's what G. R. Rothschild, assistant director, metallurgical development, Air Reduction Sales Co., a division of Air Reduction Corp., New York, has to say: "Expansion of welding into sheet metal joining has started with



WELDER ON A TREADMILL demonstrates speed of CO_2 process at A. O. Smith. Torch travels faster than operator

the development of Dip-Transfer welding. It will prove especially useful in making sheet metal fillet welds and largely replace work presently done with the slower nonconsumable electrode, inert gas shielded method (Tig)."

• Arc spotwelders are becoming faster, proving to be tough competitors for resistance methods.

Advantages of the arc spot: 1. You can make round, strong, straight-through, rivetlike welds from one side only. 2. Metal surfaces to be joined require no cleaning or preparation. 3. Quality is easily determined visually.

"Today's welding engineer has a complete array of arc spotwelding processes, each with a distinct characteristic for producing some desired effect," says B. L. Kosnik, Chrysler Corp., Detroit. Their true merits, however, won't be realized by simply substituting arc for continuous welds."

Other advantages listed by Mr. Kosnik: Less metal is needed because flanges are eliminated or reduced; the method enables a designer to employ composite assemblies of strong or medium strong metals; distortion is easily controlled; you can weld into blind sections without pressure or backing up arrangements. Arc spot opens a completely new and unexplored field, he claims.

What's the Future?

Emphasis on the science of welding is bringing to light some startling thinking. Here's what Airco's Mr. Rothschild says: "We believe that the physics and chemistry of solid surfaces has the greatest possibility for something completely new in welding." He explains it this way:

"Imagine a surface through a solid bar. How do you prepare such a surface so that when put back together it is exactly as it was before you took it apart? We don't know much about preparing such surfaces—it's related to atom growth, to crystal growth.

"We are working on a process related to that kind of thinking—the act of touching will do the joining. Why? Remember, we are going to have 1 million psi metals. It's quite probable that they won't stand any heat in joining. Such thinking is a kind of extension of diffusion bonding. The idea: If you get metals soft enough and push them together long and hard enough, they will bond."

• While the Airco approach is unusual, most developments will continue to be aimed at getting an arc to behave.

Mr. Chyle reports that the industry will probably see a solution to the problem of poor fitups within a year. (The process to which he alludes presupposes that there will be a gap, and it just welds right on over it.)

• Another approach to future trends: Look for more weldable, stronger materials.

J. Heuschkel, welding consultant, Westinghouse Electric Corp., points out that management improvements can be concentrated on design, improved processes, or improved materials. He feels that industry finds, when examining its costs, that large amounts have to be spent to overcome difficulties that can be blamed largely on materials. "Our research concentrates on providing materials which, in addition to having the basic characteristics desired, can also be joined to give characteristics needed in an assembly," he states. Example: Molybdenum. "Fifteen years ago, we couldn't join that metal satisfactorily even in a vacuum or gas filled chamber. We learned that inherent oxygen was the troublemaker. Molybdenum alloys can now be readily welded within controlled conditions."

He also cites austenitic steels. Both weld metal and base metal cracked during product fabrication, during subsequent heat treatment, and even years later after satisfactory high temperature service. "Our studies showed that commercial materials never intended for welding were damaged by brief exposure to welding temperatures. We found that many popular concepts of cracking during initial solidification, initial cooling, subsequent heat treatment, and long time exposure were not generally sound. Result: We have developed a preferred composition which more closely approaches an ideally strong, ductile, stable, austenitic metal."

• Competition among metal producers will bring many new welding ideas to the aid of metalworking.

Aluminium Ltd., Montreal, Que., has a staff of five engineers and seven technicians who work constantly to find new ways to make aluminum cheaper to use. Evidence of its success: More than 14,000 Canadian freight cars are aluminum; the latest order for subway cars for Toronto, Ont., specifies aluminum bodies. A current effort: Aluminum cans. The company says seams can be welded at rates up to 200 ipm.

Kaiser Aluminum & Chemical Corp., Oakland, Calif., points out that many weldable grades of alloys have been developed by aluminum producers (5083 and 5086 are its examples). One of that firm's latest welding techniques enables operators to join plates 2 in. thick in two passes. Arc time and shielding gas consumption have been cut in half, Kaiser claims.

The steel firms aren't idle: One is developing a method for welding extrahigh strength steels suitable for submarine applications. The material is expected to be much stronger than HY-80 currently employed.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Free to lubrication engineers and buyers

A NEW 60-page booklet that simplifies selection of the best lubricants for your needs. The Atlantic Refining Company has prepared this handsome new booklet as a modern guide to good lubrication. Called, "Keep Your Upkeep Down with Atlantic Quality Lubricants for Industry," it gives complete information—including typical properties and applications.

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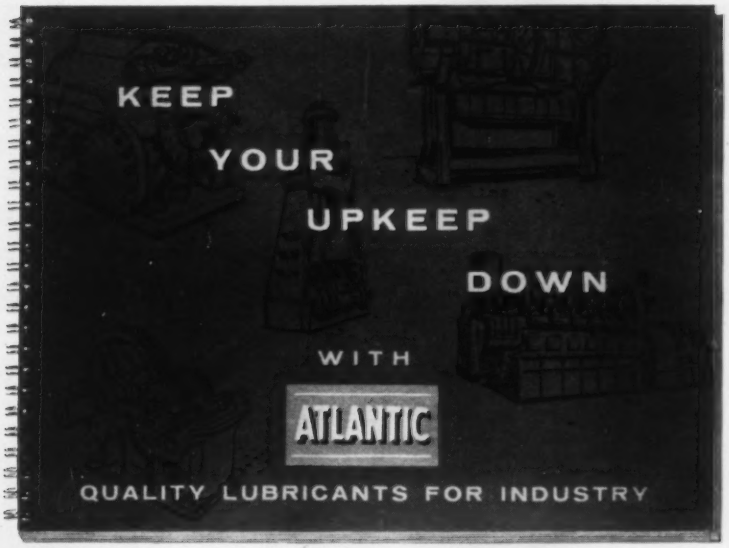

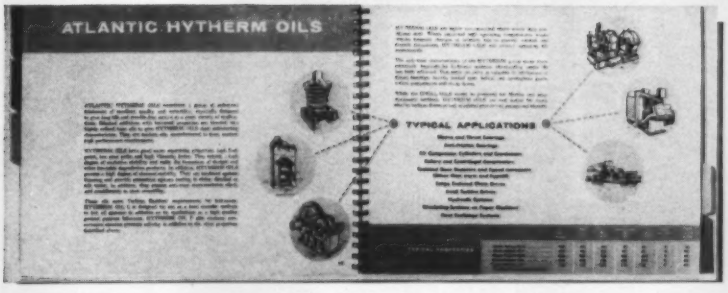

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Automatic Welder Insures Annealing Line Continuity

• CONTINUOUS PROCESSING **at high strip speeds will be an important factor in the production of high quality, uniform tin plate on a line scheduled to operate in a few months at Midwest Steel Co., Portage, Ind., a division of National Steel Corp. And the rapid, automatic joining of coil ends with high tensile welds will help insure uninterrupted product flow.**

A narrow lap, resistance seam-weld, supplied by Taylor-Winfield Corp., Warren, Ohio, will combine coils at the entry end of a continuous annealing line.

• Coil change time will be kept at a minimum by automatic preloading from a pair of payoff reels.

Two payoff reels will be employed at the entry end of the annealing line. That will make it possible for one coil to be processed while the next one is being prepared for welding.

Coil preparation: The cropped lead end of the full coil is jogged forward by a set of pinch rolls, through the automatic preloading clamp, and into the shear gap. Then the coil end is clamped in the preloader. About 4 in. of slack is gathered in the strip to provide for proper welder operation, and the strip is checked for correct cross-alignment.

• Strip ends are clamped, sheared, overlapped, and welded automatically, in about 15 seconds.

When the coil in process is nearly all paid off the uncoiler, the entry end of the line is stopped; processing continues on strip from the looping tower. The preloading mechanism is lowered to put the lead end of the new coil flat on the lower face of the entry clamp.

The operator actuates a switch to start the automatic welding cycle. Entry and exit clamps are closed, and the two strip ends are sheared. The entry clamp opens momentarily for removal of the scrap coil end, then closes. The preloader is unclamped, and the exit clamp is tilted; then the entry clamp is moved forward, overlapping the strip ends. The welding wheels close, and the welder frame travels across the strip at 420 in. per minute, joining the overlapped strip ends. When the welding cycle is completed, all clamps and wheels are withdrawn, and the strip is free to move into the looping tower and the annealing line.

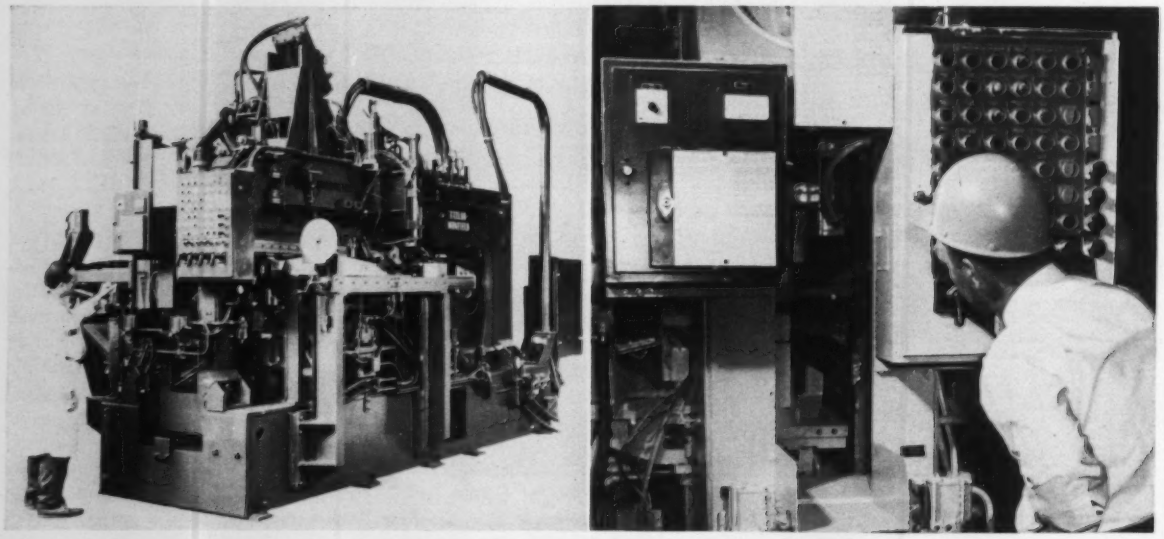
The operator can interrupt the automatic cycle prior to welding, if a correction must be made in cross alignment of the strip ends, or the cycle can be controlled manually.

• Narrow lap welds are said to have tensile strengths higher than those of the annealed parent metal.

To develop the high tensile joint strength needed in the annealing line, the strip ends are overlapped 1/32 to 3/32 in.—depending on the strip gage. Joint thickness is 1.3 to 1.6 times that of a single strip.

The lap seams aren't expected to create problems in passing over rolls in the processing line. In previous applications, they have been run at full speed through temper mills set for 10 per cent thickness reductions, and through multiple slitters.

Programed cycle starts when operator presses switch on control panel



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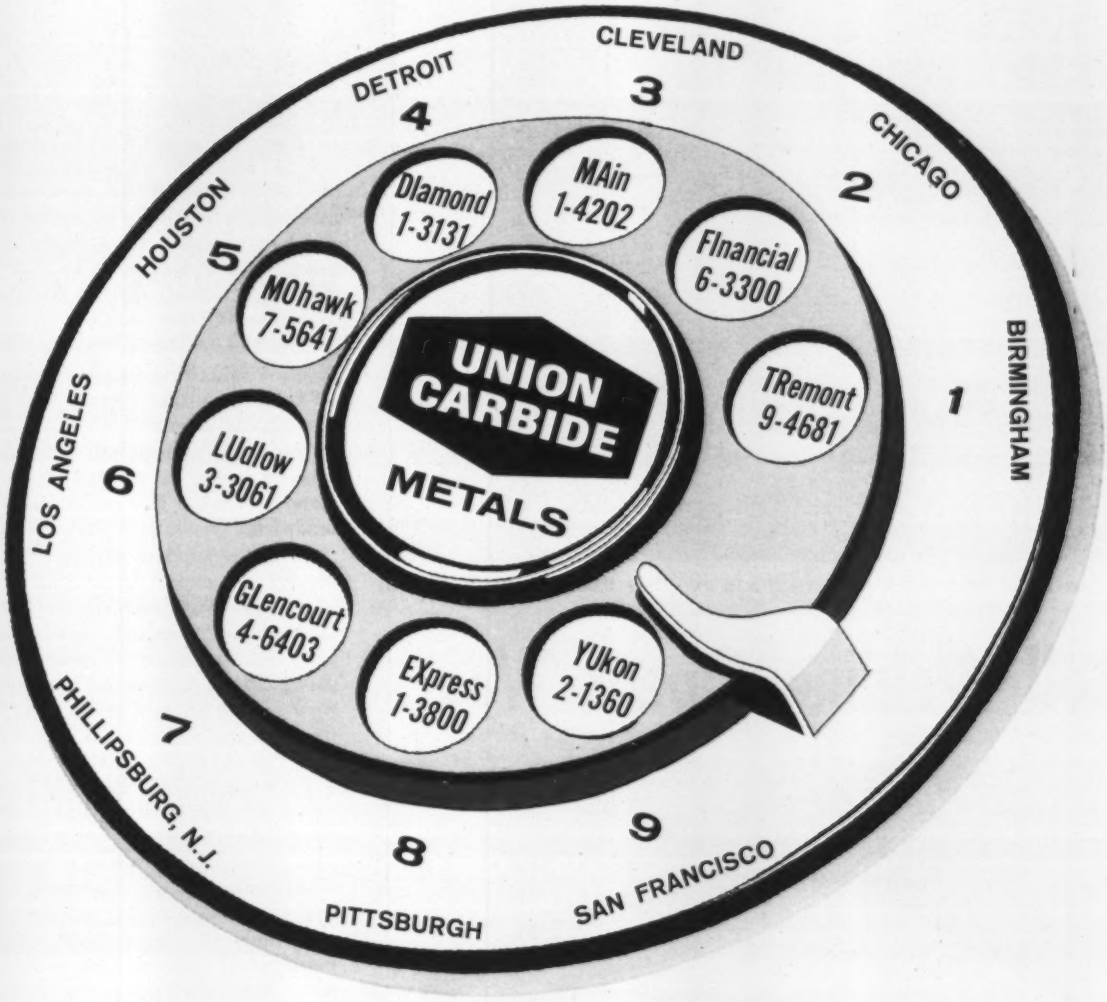

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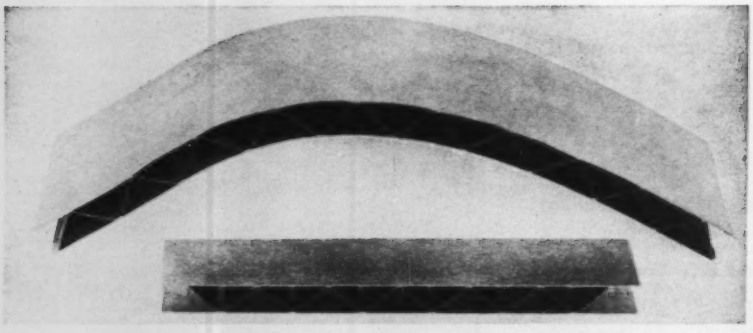
Largest panel roll welded so far is 3 x 6 ft. Only limit: Size of rolling mill

Roll Welding Opens Way



To Honeycomb Forming

A NEW method of joining corrugated honeycomb sandwiches, called roll welding, has been developed by Battelle Memorial Institute, Columbus, Ohio.

The product can be formed or drawn after bonding. Douglas Aircraft Co., Santa Monica, Calif., which sponsored the research, is producing the sandwich.

The process employs hot rolling to pressure weld the peaks of corrugated metal core to cover sheets. Size is limited only by rolling mill capacity, claims Battelle. Panels 72 by 36 by ¼ in. have been produced in 2014 aluminum; titanium; steel; molybdenum; and Inconel.

• To construct the sandwich a thin, accordion pleated metal sheet is woven over and under V-shaped iron or copper bars. A rectangular metal frame is placed around the core, and face sheets are added.

The assembly—face sheets, wedges, and thin accordion-pleated metal—is clamped by two metal cover sheets which are welded to the rectangular metal frame. The entire package is heated and rolled in a standard rolling mill in a direction parallel to the corrugations.

In addition to welding the core to both covers, rolling reduces the panel thickness up to 60 per cent to provide the corrugation shapes desired. After rolling, the retaining frame is sawed or sheared off. The metal covers are also peeled off the sandwich.

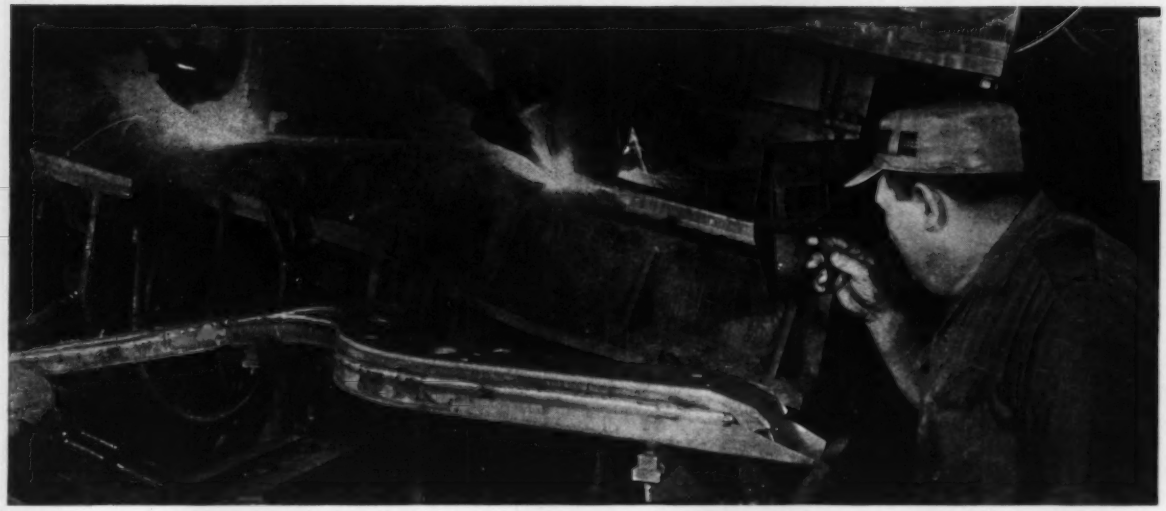
With the support wedges still in place, the entire honeycomb assembly can be formed into a variety of shapes—hemispheres, for example. Standard tooling is employed, the panel being worked as though it were a solid piece of metal of equal thickness.

• Following roll welding and forming, the wedges are leached out of the structure.

A chemical like nitric acid completely removes the wedges. Although the step is said to take several days for exceptionally large panels, it requires no special equipment and is comparatively inexpensive. Leaching can be accelerated.

Roll welding can also be employed to make sandwiches with vertically ribbed cores, since core design is determined by the design of the filler wedges. Limitation: The core must be unidirectional.

Roll welded corrugated sandwich panels approach the all-round rigidness of regular honeycomb panels, are simpler, and less costly, says Battelle.



Simple fixturing, solid control, experience back a prediction that . . .

CO_2 Welding Speeds Can Exceed 300 ipm

• THE AUTOMATIC WELDER employing carbon dioxide shielding is the "bright and shining star" on welding's horizon, believes Gordon Richards, development engineer, Midland-Ross Corp., Cleveland.

His firm employs a wide variety of such equipment to join mild steel (SAE 1010-1015) from 0.120 to 0.205 in. thick at speeds up to 200 ipm. The product: High quality frames for automobiles.

"We are convinced that speeds up to and possibly exceeding 300 ipm will soon be achieved by modifying and extending present techniques," states Mr. Richards.

He lists these advantages for CO_2:

- It produces clean, relatively spatterfree deposits.
- It is faster than manual welding.
- Equipment costs are less than competing methods.
- Joints are easily prepared. Some oil and dirt on metal surfaces can be tolerated.

• Midland-Ross is strong on combining lightweight, inexpensive fixturing with skillful design. Many of its ideas have been patented.

When engine power and speeds were increased, designers had to determine strength-torsion data and learn how to utilize metal strength more efficiently. That brought the box section frame which Midland-Ross specializes in and the need for extrasound welds.

STEEL asked Mr. Richards about the economic feasibility of a series of short welds vs. long continuous ones. "Our tests show that short welds don't work out as well as the continuous types. While you can get 90 per cent of full strength if only half the joint is welded intermittently, you can just as easily get full strength at no extra cost—the welding head must travel the full distance anyway. Besides, stops and starts produce stress raisers," states Mr. Richards.

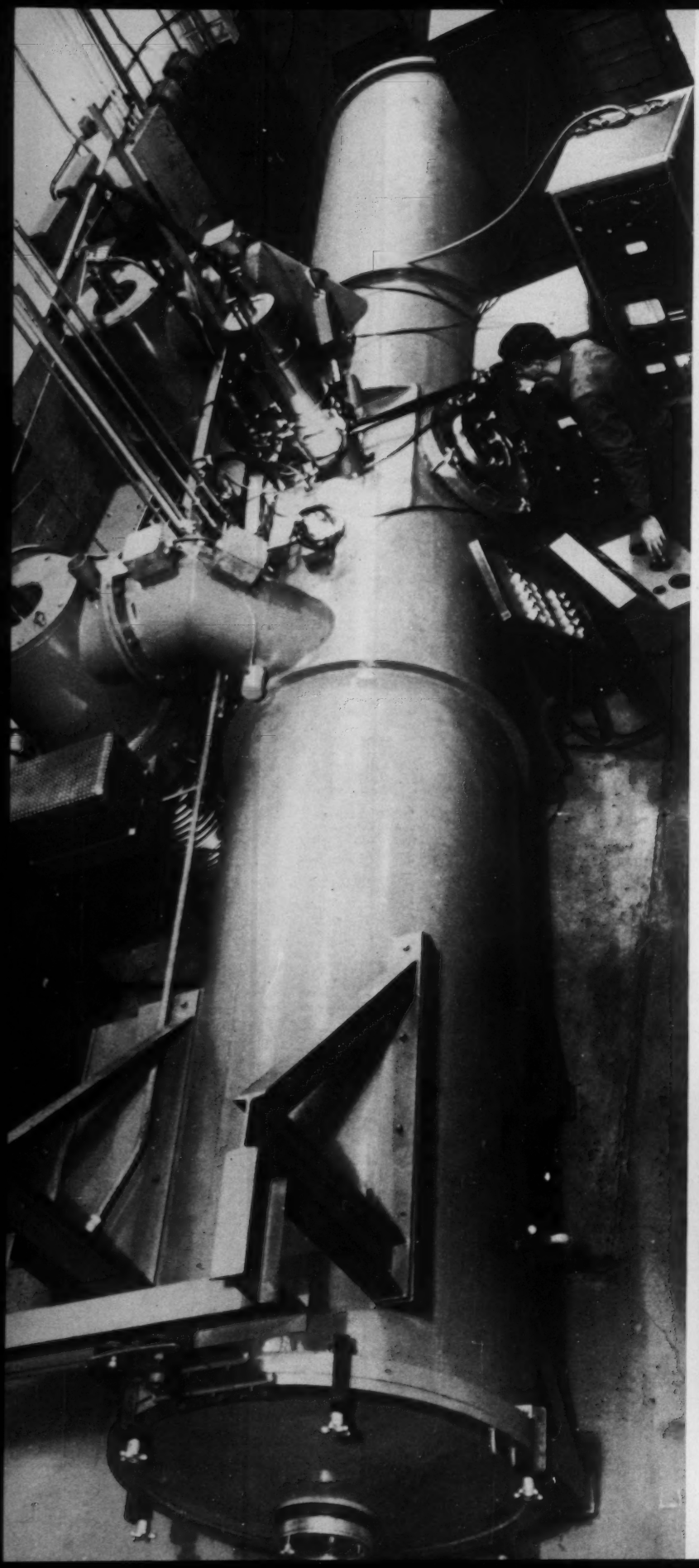
Tackwelds have been eliminated on current production. Close tolerance stampings made from shotblasted rimmed steel have built-in features for holding mating parts without clamps. In the illustration, for example, two formed halves of a longitudinal frame member have been snapped together and will hold precise dimensions while passing through the welding operation. Frame sections are handled automatically.

• The company's success is due largely to improved contacts between wire and nozzle, "rock solid" voltages, and wire feeds.

Increased speeds offered by CO_2 welding can be curtailed by several factors, states Mr. Richards. Among them: Poor contact between a fast moving wire and the welding head. Result: The head overheats and the increased resistance severely limits the amount of current transmitted to the welding wire. One solution: Alter the nozzle.

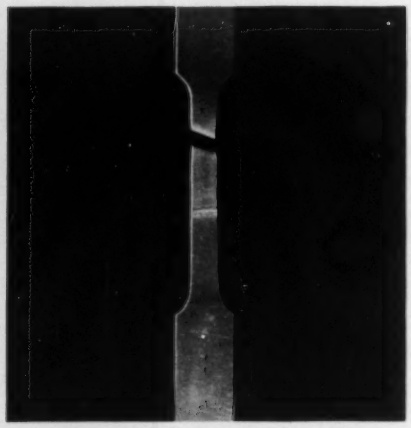
Inadequate or improper controls can cause wide variations in weld quality at ultrahigh welding speeds. Even the way wire is wound on a spool can affect the dimensions of a weld bead. Voltage variations produce similar effects. A number of innovations Mr. Richards has introduced have practically eliminated such variables.

Midland-Ross employs automatic fixtures which it claims are inexpensive but well designed. Air cylinders, for example, provide fast motion; when coupled with hydraulic damping cylinders, the units achieve great precision as well.



The huge device at the left can join parts more than 10 ft long on a regular production basis

Electron Beam Welding Breaks The Size Barrier



WELD STRENGTH in tungsten-tantalum alloy is demonstrated by tensile sample

• THE ELECTRON beam welder (at left) is used by an electrical firm to join large, complex parts for atomic energy applications. Costs were 80 per cent below estimates for another method.

The machinemaker, Hamilton Electrona Inc., New York, says it refutes those who predicted that the process could never get beyond small, easily handled items in capacity.

North American Aviation Inc., Los Angeles, is considering the electron beam method for welding 20 ft sections for advanced aircraft and missiles.

Republic Aviation Corp., Farmingdale, N. Y., is doing some "advanced thinking" about electron beam welding of tungsten parts for a Mach 2 fighter it is to build. The vacuum chamber is to be 40 ft long. Welding speeds up to 100 ipm are said to be possible.

NRC Equipment Corp., Newton, Mass., says a vacuum chamber for electron beam welding 25 ft in diameter and 75 ft long is being designed.

• The electron beam approach has great promise in all fields, experts agree; but the method will continue to show up best in nuclear and aerospace work. Thirty-six welders are said to be operating in customer plants.

These are some of the advantages of the method:

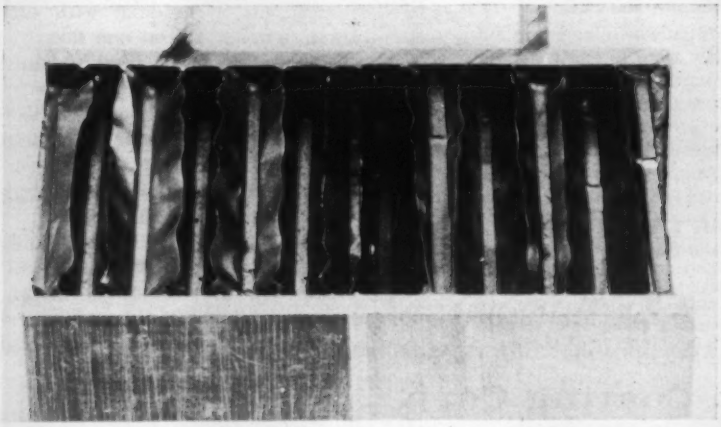
- Refined controls and high energy densities permit welding thicknesses of 0.001 in. to more than 1 in.
- Such densities and controls permit weld depths 25 times greater than nugget width.
- Weld deposits are of vacuum melted quality, have small heat affected zones, exceptionally fine grain structures.
- Because total heat input is small, weld distortion and shrinkage are almost nonexistent.
- You can weld almost anything.

One of the long parts being welded in the ultralarge device illustrated was originally slated to be fabricated from 0.120 in. stainless tubing by successive reductions through shaped rolls. Tooling costs were estimated at $47,000; each part would have cost more than $5000. Cost today: More than $1000.

An alternate method was tried (as a double check) after the electron beam method proved satisfactory. The firm had an inert atmosphere chamber large enough to hold the 10 ft pieces. Sections were formed on a press brake and joined in the atmosphere box with tungsten arc (Tig). The method was much slower and resulting distortion made the parts unusable.

Another firm found that the exceptional width to depth ratios were enough to join internal ribs inside a tube by making a buttweld right through the tube wall.

Going a step farther, the firm found that if the machine were adjusted properly, you could obtain a weld in two thicknesses of metal separated by a considerable gap. That led to the simultaneous buttwelding of honeycomb in a single pass. In the case illustrated (below), the joints are 1 in. apart.



SINGLE PASS WELD of both sides of a 1 in. honeycomb demonstrates unusual versatility of electron beam, declares Hamilton Electrona

• Units are designed for production and research. One firm, Rosemount Engineering Co., Minneapolis, has learned how to weld powdered metals with a unit made by Air Reduction Sales Co., a division of Air Reduction Co. Inc., New York.

Supersonic aircraft have brought acute demands for materials which can withstand high temperatures. One answer is powdered metal mixtures which combine several physical properties—good heat transfer, heat resistance, and high temperature strength, for example. Such materials have hard surfaces and good abrasive qualities, but attaching them to adjoining structural members has been a problem.

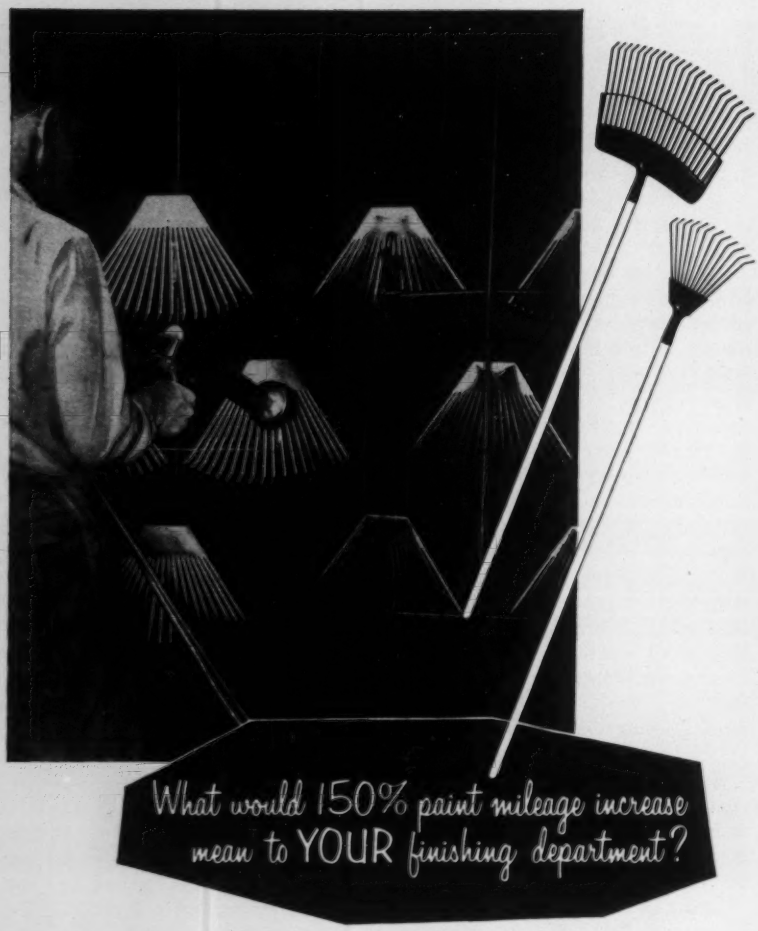
Other joining problems being solved: Tungsten to molybdenum. Previous attempts to make joints failed partly because weld metal wasn't as pure as the vacuum melted base metal. The electron beam method has overcome that problem; welds are as strong as the base metals. In addition, welds can be made in sheets only 0.005 in. thick, says Airco.

• Electron beams produce melting heat by bombarding a metal surface. The heat is focused and controlled by various magnetic devices, some of which can be programed to produce changes in size, intensity, and location.

Electron beams can fuse practically any weldable metal or alloy, even some ceramics. The same process will grain refine, stress relieve, outgas, cut, overlay, metallize, vacuum braze, or grow crystals.

These are the basic elements of such systems: A vacuum chamber and pumping system to get vacuums of 0.00001 part of an atmosphere, an electron gun, a mechanism for manipulating the gun and the work, a high voltage power supply, electrical controls.

The most significant variations in equipment are in the design and construction of the electron beam gun and its focusing and regulating mechanisms. Sciaky Bros. Inc. believes that for most of its applications 30,000 volts is sufficient to produce the kind of penetration and quality desired. Hamilton Electrona (it makes and distributes the Zeiss version) believes in voltages up to 150,000 with energy concen-



To Keller Manufacturing Co., Inc., it means a savings of nearly $50 a day in finishing costs on leaf rakes. And, theirs is a comparatively small plant operation.

Before moving into their new plant, this St. Louis manufacturer of Sweep-Easy lawn and garden tools investigated and tried out various finishing equipment. They chose Ransburg No. 2 Process to do the job because they found that only the Ransburg Electrostatic Hand Gun could give them the desirable increase in production—with improved quality—and at lower cost.

PRODUCTION IS NEARLY DOUBLED
QUALITY OF FINISH IS IMPROVED

With the Ransburg Hand Gun, Keller's daily painting prodution of leaf rakes nearly doubled what they were formerly getting with air hand spray. And, where they used to get only 168 rakes per gallon of paint, they now get 426 per gallon—over 2½ times as many—actually *an increase of over* 150% *in paint mileage.* With the unique "wrap-around" feature, electrostatic is improving the quality, providing a complete, uniform coating over all areas—even on the tine edges.

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trations of 25 million watts per square inch. The electromagnetic lens system is generally regarded as being sophisticated.

The ratio of depth of penetration to weld width is partly a matter of voltage, partly control. Hamilton Electrona says extremely high energy densities permit ratios up to 25 to 1.

Experts also say that the x-rays generated by the units are comparatively mild. Enough shielding is provided to cut detectable radiation below U. S. standards for safety.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*

Galvanized Welding Problems Solved

• THE MAJOR problem encountered by automakers using galvanized metal parts—spotwelding—has just about been solved, states Robert J. Saxon, Metal Stamping Div., Ford Motor Co., Dearborn, Mich.

Major changes which contributed to the developments: Higher welding current, higher tip pressure, and longer dwell time (up to 50 per cent). Electrodes picked up zinc—the higher weld rates required by auto production brought with it an excessive pick up of zinc on electrode tips, says Mr. Saxon. It varied with the amount of zinc on the steel.

• At first, some relief was gained by the use of material with substantially less zinc on one side.

Satisfactory welds were obtained in differentially coated sheets at rates up to 600 an hour with 3500 to 4000 welds between tip dressings. Further refinements have permitted the same results with conventional coating thicknesses.

John Widman, Ford Div. welding engineer, says that the dwell increase also isn't noticeable on automatic equipment, although operators on hand spotwelders are slowed somewhat.

• What's ahead? Ford definitely predicts increased application of galvanized to protect critical areas.

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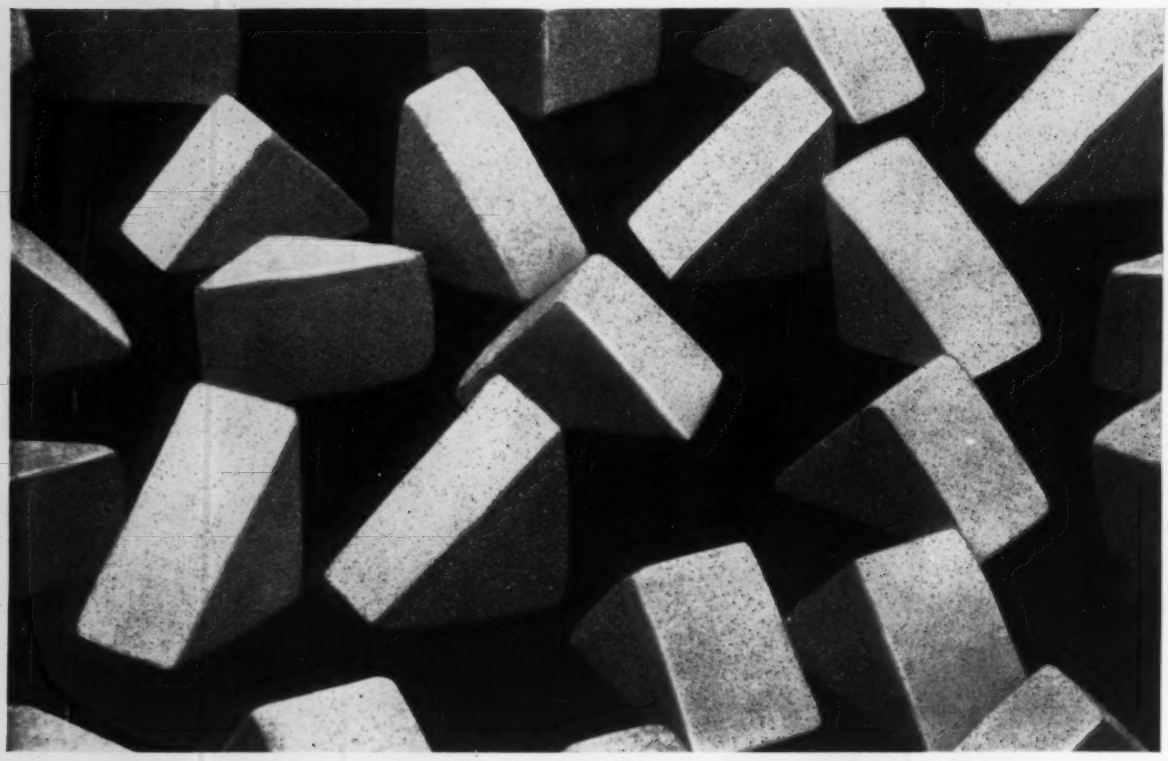

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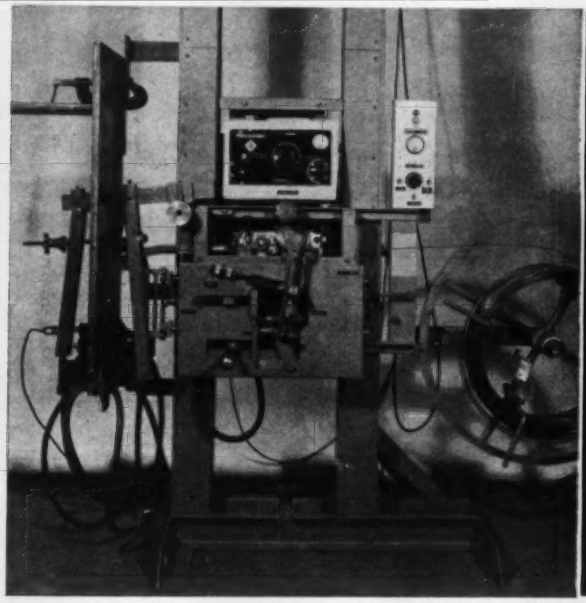
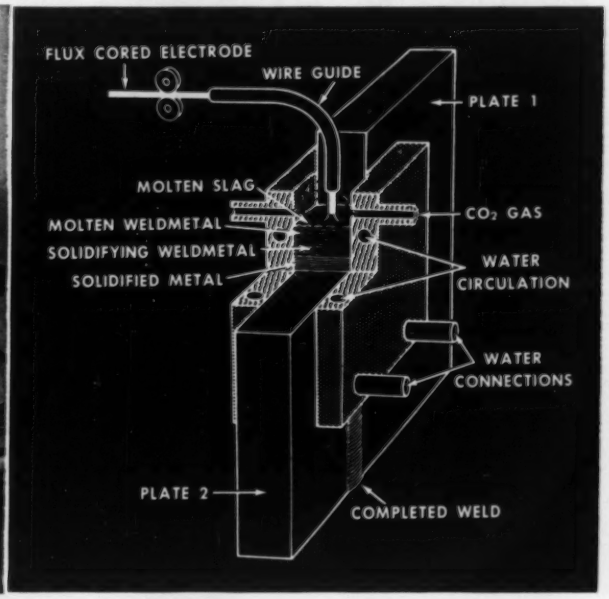




CO_2, plus flux-cored wire, provides shielding as . . .

Electrogas Welder Goes on Display

• ELECTROGAS welding, a gas shielded counterpart of the electroslag method, will be given its first public showing next week at the welding show in New York.

Developed by Arcos Corp., Philadelphia, the Vertomatic "G" employs a flux cored electrode and carbon dioxide shielding to protect the molten weld metal. The welding operation is visible.

It is said to produce vertical buttwelds in plates 3/8 to 2 in. thick at speeds between 1/2 and 3 ipm. R. D. Thomas, president of Arcos and of the American Welding Society (1960), terms quality of the welds "exceptional."

• To weld, joints are placed in a true vertical position with a 3/4 in. gap (it's not critical) between surfaces to be joined. Water cooled copper shoes press against the open sides bridging the weld gap.

The flux cored filler wire is fed continuously through a curved wire guide into the pocket formed by the plate sides and the copper shoes. The slag flows toward the copper shoes, forming a protective coating between them and the weld faces.

Spacing between plates is maintained by two U-shaped pieces tackwelded to each section.

During welding, the operator has complete control of the wire position at the point of the arc. From a control panel, he is able to change the rate of travel, transverse motion (the electrode moves back and forth through the puddle), and dwell period. No special precautions are needed to start or stop the weld —it can also be brought down to ground level quickly.

• Two parallel rails support and guide the welding equipment which contains all mechanical and electrical controls, elevating, traverse, and wire feed mechanisms.

Arms hold the water cooled shoes and the filler wire reel. Shoe arms are drawn together by a simple tensioning device. Guide rails can be made any length by adding sections.

The flux cored filler wire is a composite made of slag producing powders enclosed in a folded, formed strip of mild steel. The construction gives an even distribution of metal and powder. Its cross section is designed to conduct current evenly, not on the outside only.

Slag forms as a thin molten film which covers the weld puddle and the finished weld, and shoe surfaces. It is easily removed, says Arcos.

The machine is sturdy but light enough to take to a welding site. Any standard, direct current welding source is satisfactory if it will deliver 600 amperes continuously.

(*Please turn to Page* 106)

NEW PRODUCTS and equipment

(*Continued from Page* 105)

Gas Welding, Plasma Arc Processes Announced

GAS WELDING developments at Linde include a low cost process that produces J-grooves in a single pass for heavy plate edge preparation, an oxy-natural gas cutting torch, the Oxweld C-66 that slices through 30 in. of metal in a single pass (with a 15 per cent reduction in operating costs), and an economy class, portable, hand guided cutting machine (Oxweld CM-75) that weighs only 19 lb.

Also introduced are two plasma arc processes, Plasmarc welding and Plasmarc weld surfacing, and a low cost package for high quality, short arc, (Mig) welding of sheet metal.

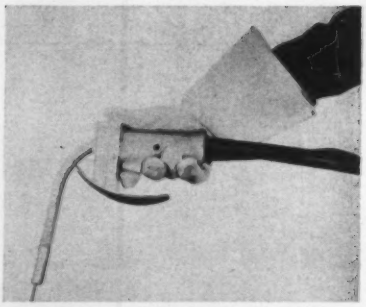
See them at the American Welding Exposition, or *write* Linde Co., a division of Union Carbide Corp., 270 Park Ave., New York 17, N. Y.

Deposition Rates for Production Welding High

A SEMIAUTOMATIC production welder can be used for machine and structural fabrication. The unit, Innershield Squirt welder, continuously feeds a tubular self-shielding electrode through a welding gun that is normally supported and guided along the joint being welded.

The company says it was designed to provide the high deposition rates of an automatic process while maintaining the flexibility and adaptability of manual welding.

A dc motor-generator supplies power for the welding range (350 to 600 amperes). Amperage control is achieved by varying wire feed speed. Current and arc voltage controls are conveniently located on the tilted control panel. The panel contains an electrode inch button, polarity switch, volt meters, and ammeters.



See it at the American Welding Exposition, or *write* Lincoln Electric Co., 22801 St. Clair Ave., Cleveland 17, Ohio.

Larger Sections Joined by Ultrasonics

THE 36 IN. THROAT depth on the Sonoweld ultrasonic welder (Model W-4000-FSR) permits larger components to be welded than was possible on the previous unit. A separate electronic power source can be located at spots remote from the welding area to save floor space. The power source is packaged in a dusttight, heavy duty steel cabinet.

A variety of metal and bimetal joining can be handled, including some of the new alloys which are difficult or impossible to join by conventional means. It's effective with molybdenum, columbium, tantalum, tungsten, and other refractory metals. It can join aluminum alloys up to 0.072 in. thick, stainless steels up to 0.035 in. thick and requires only 8200 va line power. Smaller sizes are also available.

See it at the American Welding Exposition, or *write* Sonobond Corp., West Chester, Pa., a subsidiary of Aeroprojects Inc.

Ratings Added to Line of Temperature Indicators

TEMPERATURE at 50° F intervals in the range from 2000 to 2500° F can now be determined by stick type temperature indicators. You can now choose from a total of 86 different ratings from 100 to 2500° F. High temperature levels can be determined within 1 per cent, says the company.

See them at the American Welding Exposition, or *write* Tempil° Corp., 132 W. 22nd St., New York 11, N. Y.

90 Degree Corners Traced By Electronic Unit

AN ELECTRONIC tracer made by Airco is suited for nonrepetitive cutting work or other work where a minimum investment is necessary. The unit (designated Aircotron, Model J) uses templates prepared by conventional drafting methods.

Stepless cutting speed control is provided. The unit can trace 90 degree corners (radiuses are not required). Width of the line must be maintained between 0.020 and 0.040 in. The unit is not affected by extraneous light. The head is

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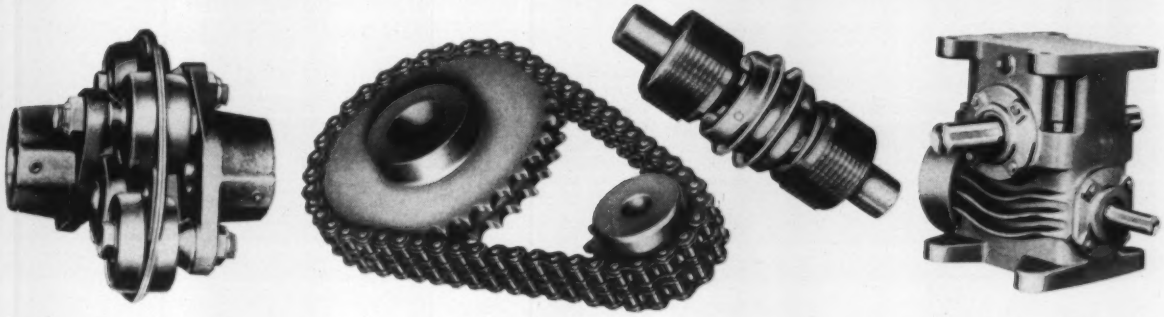
Basic Drives, Speed Reducers, Couplings, Clutches—only Morse makes all four and only Morse stocks all four. For example, if your industrial drive problem involves basic drives such as roller chain, silent chain, and Hy-Vo® Drives, or "Timing"® belts, friction clutches, and couplings, too, look to Morse for the answer. You'll get impartial engineering help and immediate delivery.



As for quality, Morse products speak for themselves: Morse timing chain is original equipment in over 76% of American cars. So whatever your industrial drive problem, see your Morse man. He's in the Yellow Pages. Or write: Morse Chain Co., Dept. 2-41, Ithaca, N.Y. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ont.

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HOW TO TAKE THE EDGE OFF A HEADACHE

KUTWELL® EP 66 is a new high-quality, water-soluble cutting oil designed to do the tough jobs—cutting special alloys and high-strength tool steels. Its powerful, extreme pressure agents take the toughest cutting, grinding, and drilling jobs in stride. Pieces per tool grind have jumped dramatically when Kutwell EP66 was used instead of higher-cost specialty oils. Machine tool lubrication and rancidity control are effectively maintained.

FEBIS® K lubricants improve machining precision by eliminating troublesome "stick-slip" motion. Febis K lets the carriage proceed smoothly throughout its stroke; actually makes static friction less than sliding friction.

NEBULA® EP multi-use grease serves all grease-lubricated parts, even those which require extreme pressure properties. It does an efficient job at high temperatures and resists oxidation for long periods. Your Esso representative is an expert at curing all kinds of lubrication headaches. Contact him, or write us at 15 West 51st St., N. Y. 19, N. Y.

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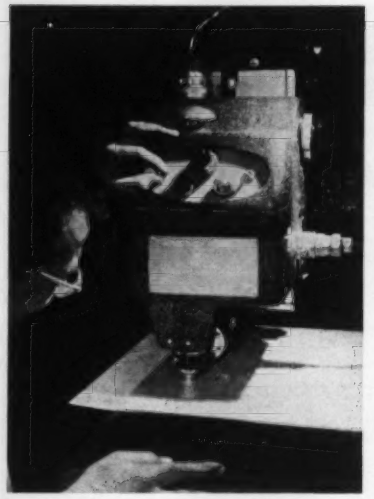


mounted on the operating bar of the cutting machine and automatically provides the desired motion of the torches during the cutting operation. The unit has a cutting range speed from 5 to 24 in. and uses 115 volt, 50 cycle, single phase current at 5 amperes. Higher or lower speeds can be obtained by substituting an appropriate drive motor.

Other Airco developments include a mild steel welding wire with flux in its center, a balanced wave Heliweld package, a metal to metal surfacing process, and a stake-seamer and welding positioner unit.

See them at the American Welding Exposition, or *write* Air Reduction Sales Co., a division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y.

Silver Brazing Alloy Big Time Saver

BRAZING TIME can be cut by two-thirds through use of a flux coated, silver brazing type alloy, says the manufacturer. EutecSil 1020FC alloy, it says, has the advantages of conventional silver brazing type rod while eliminating the need for flux mixing and application. It reduces the need for precleaning and preheating.

The alloy is available in rod diameters of 1/16 and 3/32 in. It's suitable for ferrous and nonferrous metals and all types of joints including tee, butt, fillet, and lap or sleeve. Features include low application temperature, high fluidity, strength, and high electrical conductivity. Deposits are cadmium-free and may be used safely on food vessels and processing equipment.

Other products developed by the company include a paste chemical weld area cleaning compound (Eucleen) for easy, economical removal of oxide films without pickling and a highly conductive, solder type alloy called Neu-Tec-Tronic 157BN.

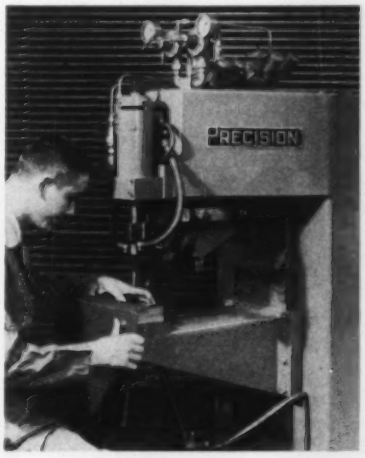
See them at the American Welding Exposition, or *write* Eutectic Welding Alloys Corp., 40-40 172nd St., Flushing 58, N. Y.

Unit Welds Coated Steels Without Marring Surface

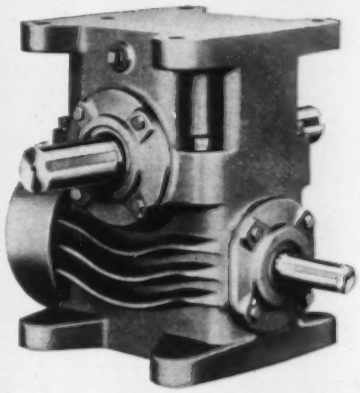
VINYL coated steels or painted steel products can be welded without burning or marking when using the AVA type, magnetic force welder. The welds are high strength types, the company adds.

The machine has a circular magnetic, 4 in. diameter gun; a dual weld, force transformer arrangement; and a special, dual contactor, control panel. Production rates can be maintained with such items as automobile dash panels and accessories, portable radio and typewriter cases, luggage, paneling, and picture frames.

Another unit developed by the company, a Peco butt seamwelder, can be used for scrap welding for the automotive industry, tank and



A Morse answer



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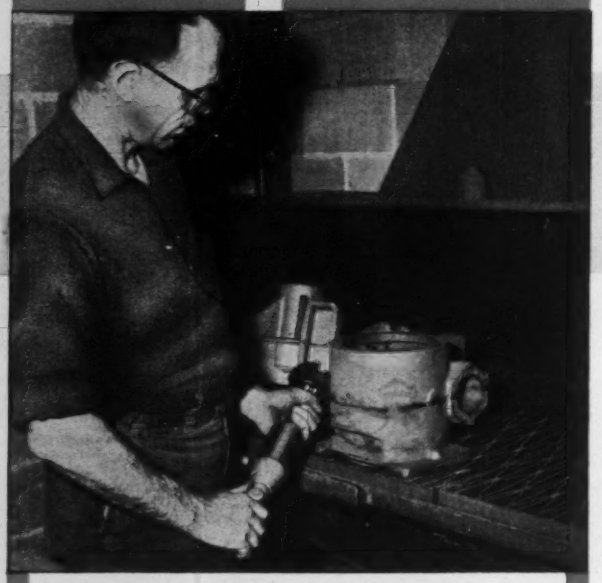

Now! You can choose the abrasive tools that best fit your needs from 138 sizes and types of Ingersoll-Rand Grinders.

features

- **Sensitive Weight-Type Governor**—prevents overspeeding, assures positive, accurate speed control.
- **Improved Muffling**—15 decibels quieter than comparable tools.
- **Built-In Lubricator**—automatic motor lubrication increases tool life.
- **Built-In Air Strainer**—protects motor.
- **Rubber-Faced Throttle Valve**—unaffected by moisture, dirt and rust.

New Series 15 Grinders

- **Speed—6000, 9000, 12000 and 15000 rpm**
- **Weight—6½ lbs.**
- **Length—16⅝ ins.**
- **Grip or straight handles with lever or thumb throttles**

Twelve new Ingersoll-Rand grinders in a completely new size and power range! These small, high-performance grinders are specifically designed to fill the need for light weight, easy-handling tools that will hold their speed under load on a wide variety of difficult grinding and buffing jobs.

Series 15 Grinders fill the bill—and offer manufacturers important new proof of tools to increase Annual Dividends on Payroll Dollars.*

*Ask your AIRengineer for a convincing on-the-spot demonstration of how these new grinders—as well as all other Ingersoll-Rand air tools—can earn an Annual Dividend on your Payroll Dollars.

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appliance welding, and other applications requiring a nonoverlapping, smooth surface with good appearance.

Antifriction seam heads work in conjunction with two motors (one forward, one reverse) coupled to drive by fast action magnetic clutches and a Saginaw screw to provide a welding speed range of 3 to 30 ft per minute. Magnetic table clamps hold the work in place for welding.

See the units at the American Welding Exposition, or *write* Precision Welder & Flexopress Corp., 3520 Ibsen Ave., Cincinnati 9, Ohio.

200 Ampere Unit Operates Small Mig Hand Guns

WITH the SCP-200 welder, you can operate small, air cooled, Mig hand guns and other small diameter constant wire feed equipment.

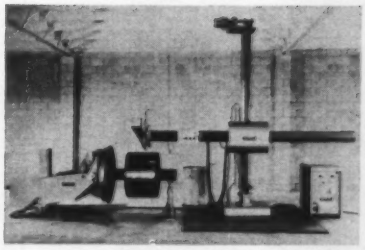
The manufacturer describes the unit as a 200 ampere, single phase, constant potential, dc welder for metallic, inert gas welding. It operates with all shielding gases and works equally well with carbon steel, aluminum, stainless steel, and other wires.

See it at the American Welding Exposition, or *write* Miller Electric Mfg. Co. Inc., P. O. Box 798, Appleton, Wis.

Welding System Has 3000 lb Positioner

THE MODEL UW universal welder is a complete system that is capable of cylindrical, conical, and straight line welding. The 3000 lb capacity positioner tilts the workpiece through a 120 degree angle and is equipped with power elevation and thyratron controlled rotation.

All electrical controls are conveniently unitized in a portable control panel. The ram type manipulator has a vertical travel from 6 in. to 8 ft 6 in. Horizontal travel is 10 in. Travel speed ranges from 5 ipm to about 60 ipm.



The manipulator mast is capable of 360 degree rotation. The power source is a dc, constant potential, selenium rectifier type. Input: 220 to 440 volts. Output: 500 amperes at 40 volts, 100 per cent duty cycle. The unit has five point slope control.

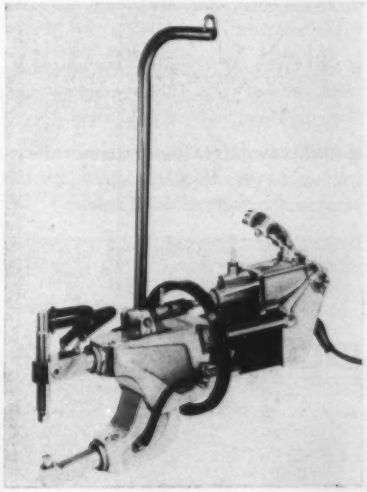
Another development is the Stoody Crushermatic, a compact, versatile system for automatically rebuilding and hard facing crusher rolls in position. It deposits up to 20 lb per hour.

See them at the American Welding Exposition, or *write* Stoody Co., Whittier, Calif.

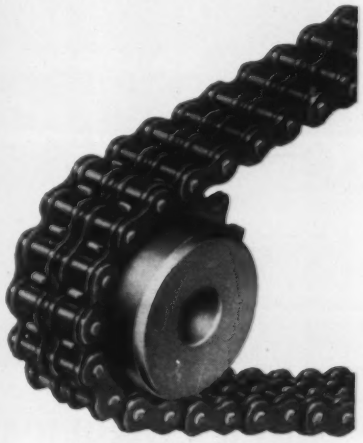
Spotwelding Gun Has High Power and Tip Pressure

HIGH POWER and high tip pressure are features of the L-407 portable spotwelding gun. The automatic unit is air operated, water-cooled, and has variable squeeze-weld and forge time for single or repeat action.

Standard equipment includes ski-lift type gyroscopic suspension, extra heavy arms, No. 1 Morse taper tips, and a noncorrosive water filter. A low voltage Microswitch in the



A Morse answer



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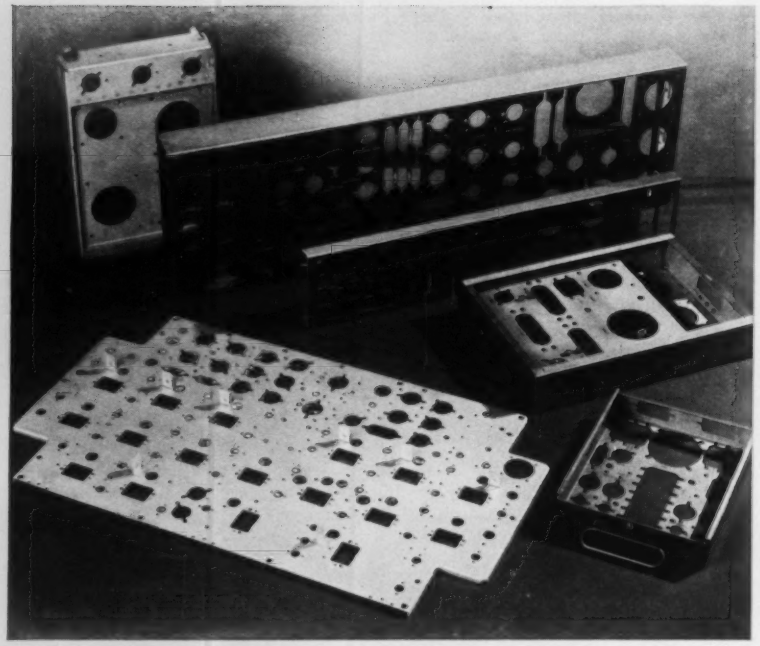

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With the new improved STRIPPIT 15-A Fabricator, complicated patterns of round and shaped holes can be produced quickly and accurately in sheet material. A high speed punch press that enables you to produce finished pieces directly from drawings, the versatile STRIPPIT 15-A eliminates slow "in-between" tool designing and die making...saves you days or even weeks of valuable time.

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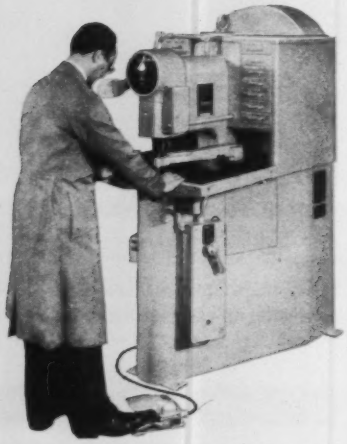

The STRIPPIT 15-A:

- **PUNCHES** any round or shaped hole up to 3½" diameter. Maximum material thickness is ¼".
- **NOTCHES** 90° corners—rectangular, radii, vee and special shape edge notches—up to ⅛" capacity in mild steel.
- **NIBBLES** straight line or contour shearing up to 38" diameter circle, at 165 strokes a minute, ⅛" mild steel.

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NEW PRODUCTS and equipment

trigger handle initiates the welding sequence through a pilot valve incorporated in the timer.

See it at the American Welding Exposition, or *write* Aro Spot Welder Corp., 66-10 Woodside 77, N. Y.

Acetylene Cylinder Has 1000 cu ft Capacity

AN ACETYLENE cylinder developed by Coyne weighs about 500 lb when full. Capacity is 1000 cu ft.

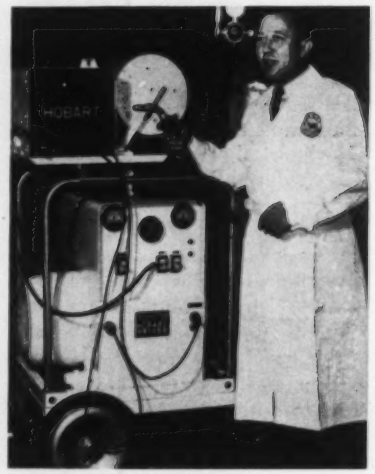
The manufacturer says the cylinder is convenient to use for many manifolding operations along with the 3000 cu ft liquid oxygen cylinders.

See it at the American Welding Exposition, or *write* Coyne Cylinder Co., 224 Ryan Way, S. San Francisco, Calif.

Welding Process Uses Small Diameter Wire

A COMPACT, constant voltage, motor-generator welder (rated 200 amperes at 25 volts) is designed especially for automatic welding with small diameter wire.

The process, called Micro-Wire welding, employs a semiautomatic or fully automatic low amperage, electric arc technique which continuously feeds a small diameter, bare wire electrode into a welding



zone shielded by a gas (usually carbon dioxide or a mixture of argon and carbon dioxide).

The company says the open arc process produces a high quality weld on various metals, particularly those in the sheet metal classification and where poor joint fitups are encountered.

The Model 1259 (complete portable package) includes a 200 ampere, constant voltage welder with ammeter and voltmeter, automatic wire feed unit, Micro gun and cable assembly, all on a portable mounting with room for carrying two gas cylinders.

See it at the American Welding Exposition, or *write* Hobart Bros. Co., Troy, Ohio.

Welding Alloys Meet Nuclear Standards

TWO Inconel alloy welding materials have been designed to meet the standards set for nuclear applications. The materials, designated 182 electrode (for metal arcwelding) and 82 filler metal (for inert-gas shielded procedures) provide a high level of weld integrity—even for joining or overlaying unusually thick sections, says the maker.

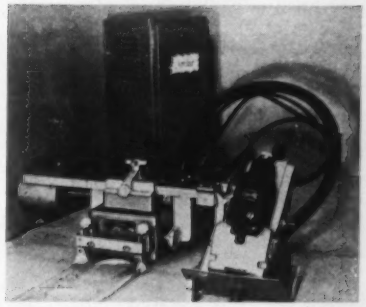
In addition, the welds deposited by the materials have good mechanical properties which are not adversely affected by normal stress relieving heat treatments used for steels, says the company.

See them at the American Welding Exposition, or *write* Huntington Alloy Products Div., International Nickel Co., Huntington, W. Va.

Automatic Torches Do Heavy Fabricating Work

THE MODEL Q-5 heavy duty automatic torch was designed for mechanized weld preparation, especially heavy gage plate work, either flat or cylindrical (such as tanks and vessels).

Another Arcair unit, Model T-5, is a heavy duty, semiautomatic torch for heavy gage fabricating applications. The carbon is fed by handwheel and is designed to fit



on any cutting machine to obtain s m o o t h, uniform, machinelike grooves.

See them at the American Welding Exposition, or *write* Arcair Co., P. O. Box 431, Lancaster, Ohio.

Line Tracers, Movable Tracing Table Developed

TWO, transistorized line tracers for shape cutting machines have been introduced by NCG. An additional feature for NCG cutting machines is a movable tracing table.

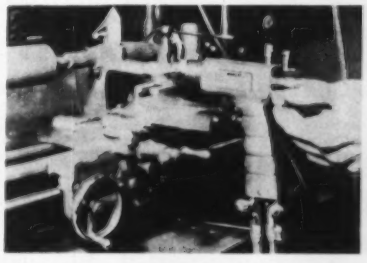
Other new equipment includes control units, wire dispensers, and welding guns.

See them at the American Welding Exposition, or *write* National Cylinder Gas Div., Chemetron Corp., 840 N. Michigan Ave., Chicago 11, Ill.

Metallizing Unit Sprays Wide Variety of Metals

A MEDIUM capacity, high efficiency Spraywelder (Model F) is designed to hardsurface a wide variety of metals and alloys with Colmonoy powders. It's also suited for flame spray metallizing with a broad range of materials.

Also developed are two experimental hard surfacing alloys (Wallex No. 50 and Colmonoy No. 8) and powdered Nicrobraz brazing



A Morse answer

Morflex couplings

...when the problem involves vibration and misalignment

Isolate vibration

Cushion shock

Absorb misalignment

Torsionally flexible

Impervious to water, dirt, oil

Arrest electrolysis

Distributor-stocked

Got a coupling problem? Call your Morse distributor. He's listed in the Yellow Pages.

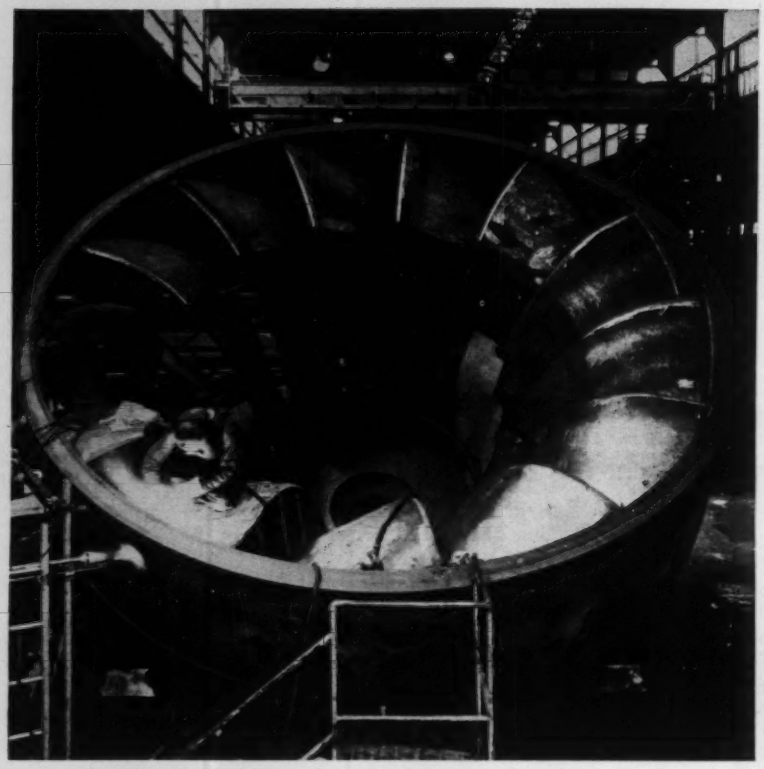
MORSE

A BORG WARNER INDUSTRY

BW

Morse Chain Co., Dept. 2-41, Ithaca, N.Y. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ont.

WELD WITH ARCOS STAINLESS ELECTRODES



Job Report Courtesy of Allis-Chalmers Mfg. Co., Milwaukee, Wisconsin

Hydraulic turbine runner blades overlaid to resist cavitation. To protect the blades of this huge hydraulic turbine runner from the destructive effects of water wear, Arcos stainless rods were selected for overlaying critical areas. The precise chemical and metallurgical properties of Arcos stainless rods—assuring uniform, predictable results—make this process both dependable and economical. Meet your stainless welding requirements with Arcos—the most complete selection available anywhere.

ARCOS

Arcos Corporation • 1500 S. 50th St. • Philadelphia 43, Pa.

NEW PRODUCTS and equipment

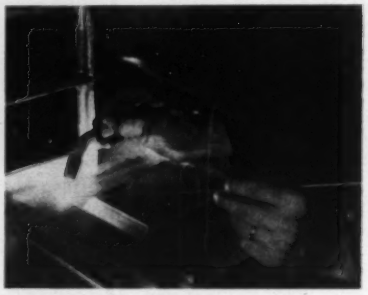
alloys in a high viscosity vehicle.

Wallex No. 50 is a cobalt-base powder of the cobalt-chrome-tungsten type which is designed for Sprayweld application. Colmonoy No. 8, a nickel-chrome-boron alloy, provides better resistance to oxidation and corrosion and improved resistance to high stress abrasion.

See them at the American Welding Exposition, or *write* Wall Colmonoy Corp., 19345 John R. St., Detroit 3, Mich.

Flexible Torch Head Permits Wide Movement

THE CONTINUOUS flexibility of the head on the Falstrom controlled angle torch permits 180 degree movement in any direction. It can do tungsten inert gas arcwelding.



The company says the unit can speed welding, improve quality, cut fatigue and give troublefree, long duty service.

See it at the American Welding Exposition, or *write* Falstrom Co., Falstrom Court, Passaic, N. J.

Welder Can Be Used In Several Processes

A 500 AMPERE, dc welder features a completely sealed cabinet and water cooled transformers and rectifiers. The cabinet is only 13 in. deep, making the unit readily suitable for wall, machine, or balcony mounting in addition to floor mounting. It can be used for Mig, Tig, CO_2 and short arc processes.

Also introduced is a pull type Mig torch which houses the drive

motor and tachometer feedback generator. Features are light weight and extreme flexibility. Cable lengths up to 25 ft are easily provided—more if necessary.

See them at the American Welding Exposition, or *write* Welduction Corp., 19400 W. Eight Mile Rd., P. O. Box 146, Southfield, Mich.

Machine Shears and Flanges Various Foils

VARIOUS foils can be sheared and flanged on the Model 60008 roll shear flanging machine. The unit eliminates the need for filler wire, provides true and accurate abutting edges, and insures exact control of weld reinforcement and weld nugget geometry.

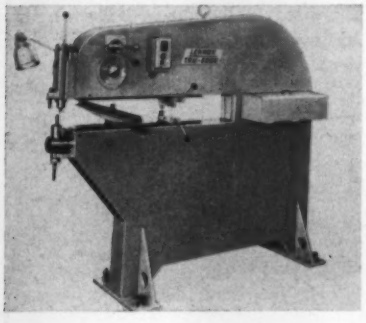
The unit can handle foil panels up to 48 in. wide, 0.004 to 0.010 in. thick steel, stainless steel, and similar alloys, and 0.015 in. aluminum or similar alloys.

See it at the American Welding Exposition, or *write* Airline Welding & Engineering, 15899 S. San Pedro St., Gardena, Calif.

Unit Shears, Forms, Pierces Steel Plates

A SHEARING, forming, and piercing machine, the Metlmastr cuts in the center of 1/4 in. mild steel plate without a starting hole. Other improved features include a simplified stroke adjustment with positive stroke scale and a streamlined, rugged design with controls on one side of the machine for easy operation.

Maximum edge cutting capacity is 1 gage in mild steel plate and 5 gage in stainless steel. Throat depth is 49 1/4 in. permitting circle



WELD WITH ARCOS FOR QUALITY WELD METAL

Arcos offers a complete line of filler metals for welding stainless, low alloy steels, mild steels, aluminum, and for hard surfacing . . . manually or automatically. Arcos covered electrodes, electrode wires, and filler rods are available for manual arc, submerged arc, inert gas, CO_2 shielded, and electroslag processes. The quality of all Arcos filler metal products, including fluxes for submerged arc welding and EB Inserts for root pass welding, is carefully controlled. *Make* sure it's Arcos . . . *be* sure of top performance.

ARCOS

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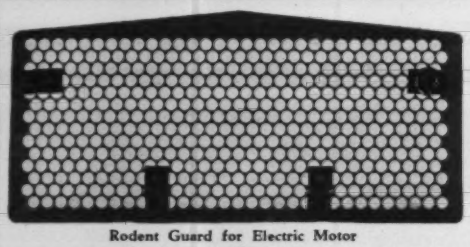
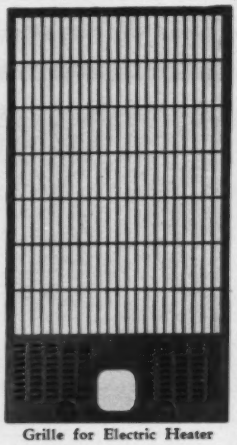


Rodent Guard for Electric Motor



Grille for Electric Heater

THEY SAVE MONEY

by letting

"DIAMOND" DO IT

For nearly half a century we have been furnishing perforated metal sheets, plates and parts to manufacturers of industrial equipment and household appliances, at lower cost than if the work were done in their own shops. No magic — just because we are especially equipped and organized for that type of work.

Let us quote on YOUR requirements. When given sufficient information, our experienced engineers are often able to make money-saving suggestions and always welcome an opportunity to do so.

Our new 32-page catalog illustrates a great variety of perforated metal patterns and gives complete working data. Also shows many modern applications. Write for Catalog 59. No charge or obligation.

DIAMOND MANUFACTURING CO., WYOMING (Wilkes Barre Area) **PENNA.**

Manufacturers of DIAMOND Perforated Metal Panels for Modern Acoustical Ceilings.

What makes the first gear-type coupling still first choice?

Check design . . . and you'll find Fast's Couplings (the original gear-type couplings) are superbly engineered, ruggedly built, smoothly running units designed to outlast the machines they connect.

Check completeness of line . . . and you'll find Fast's Couplings come in a complete range of sizes and types for shafts from ½" to 32" and larger.

Check service . . . and you'll find Fast's Couplings are backed by expert help from experienced field engineers . . . while outstanding stock facilities throughout the country insure speedy delivery of your coupling orders.

Check popularity . . . and you'll find Fast's Couplings are the choice of more industrial equipment manufacturers than any other shaft coupling.

Check Fast's for your coupling needs today.

KOPPERS COMPANY, INC., 304 Scott St., Baltimore 3, Md.

KOPPERS

FAST'S COUPLINGS

Engineered Products Sold with Service

NEW PRODUCTS and equipment

cutting up to 48 in. (diameter) inside the throat.

The manufacturer says it cuts straight, circular, inside or irregular shapes, slots and louvers, as well as performing beading, planishing, flanging, edge bending, joggling, nibbling, and hole piercing operations.

See it at the American Welding Exposition, or *write* Lennox Tool & Machine Builders, Lima, Ohio.

Welding Torch Fast; It Saves on Gas

GAS SAVINGS and fast welding are features of the 90 degree Tec torch. The unit (Model No. 4220) is water cooled and has a rating of 350 amperes, continuous duty cycle.

With regular length Vycor nozzles, tungsten lengths up to 2½ in. can be employed. With the extra long nozzles standard on Tec equipment, 6 in. is the maximum. It can handle electrode diameters from 0.010 to 0.156 in.

See it at the American Welding Exposition, or *write* Tec Torch Co. Inc., 300 Paterson Ave., Carlstadt, N. J.

Positioner Handles 100 lb Through 135 Degree Range

FOR SMALL work, the Ransome bench model positioner is a welcome addition to many shops and assembly lines. Capacity: 100 lb (at 1 in. center of gravity) through a 135 degree range.

The load can be rotated at any speed up to 6 rpm. The unit weighs only 65 lb and it can be mounted on bench or pedestal. Remote control of variable speeds by

foot switch is optional. The 14 in. table has a hollow spindle and four T-slots at right angles for easy attachment of work and channels under the T-slots to catch foreign matter.

See it at the American Welding Exposition, or *write* Ransome Co., Scotch Plains, N. J.

Heat Treating, Welding Methods Introduced

PROCESSES for welding rails and rebars (Exoweld) and for preheat and postheat treatment of field weldments (Exoanneal) have been developed by Exomet.

Exoweld is a thermit welding process and is provided as a kit that includes preformed molds. It provides preheat and postheat treatment.

The Exoanneal process uses exothermic materials for preheat and postheat treatment of field weldments. The exothermic and insulating sleeves required for a joint weld are molded to fit the joint contour and are packaged in a complete kit ready for application. Kits are available for most alloy temperatures and shapes. Advantages: Correct maximum temperature and cooling rate, low manhour requirements, and no skilled labor requirements.

See them at the American Welding Exposition, or *write* Exomet Inc., Conneaut, Ohio.

Three Welders Developed

THREE welders have been developed by Mid-States. One, the Magna Tran series, has an electrically controlled current output system for use in shielded inert gas welding or metallic arcwelding. Extra high power factor correction is built in for lower line draw and more economical operation. Three ranges are provided with current settings of 3 to 100 amperes, 30 to 250 amperes, and 125 to 410 amperes.

The Sil-A-Tran is a series of three phase rectifiers incorporating silicon rectifiers. The company says the silicon will deliver full power for the life of the machine. The 300

HOW KAISER BENDS ALUMINUM CONDUIT ELBOWS...at low cost!

Low-cost volume forming of conduit elbows by the Kaiser Aluminum & Chemical Corporation at their Dolton, Illinois, plant has been important to their attainment of a leading position in the production of aluminum electrical conduit. Conduit and elbows are produced in 13 standard sizes ranging from ½" to 6" I.P.S. A single, versatile Pines Model 3 Bending Machine handles the ten standard conduit sizes from ½" to 4" . . . producing smooth 90° elbows with speed and accuracy.

The conduit elbows are bent without the use of mandrels, keeping tool costs low. Even without mandrels, there is no distortion of prethreaded ends and flattening is held well within the limits set up by the Underwriters Laboratories Code. Production of smaller size elbows is increased up to 75% by bending two at a time on stacked tools.

Find out now how the speed and versatility of Pines Bending Machines can help you produce better quality products that cost less.

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PINES ENGINEERING CO., INC.

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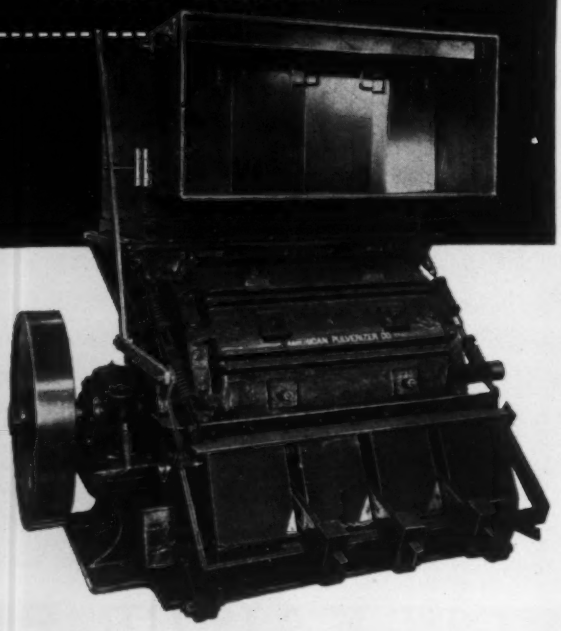
convert metal turnings into cash

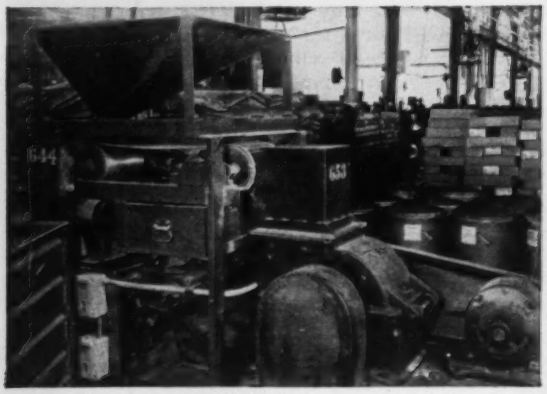


Long, curly, troublesome metal turnings, reduced in an American Metal Turnings Crusher, can produce additional profits for your plant.

Reduced to chip form, metal turnings bring $2 to $5 more per ton. Handling metal chips by shovel or pneumatic systems is easier, too, and chips require 75% less storage space than bulky machine turnings. You'll recover more cutting oil from chips . . . up to 50 gallons per ton! More important, American Metal Turnings Crushers pay for themselves and produce substantial profits for years to come. Models available with capacities ranging from 1 to 50 tons per hour. To get all the details, write American today.

reclaim fused welding flux

One industrial plant saved more than $10,000 a year by using an American Welding Flux Crusher to regranulate fused welding flux. Write American for details.



American PULVERIZER COMPANY

ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

1539 MACKLIND SAINT LOUIS 10, MISSOURI

NEW PRODUCTS and equipment

ampere machine has a range of 5 to 90 on the low setting, 35 to 240 on high.

It's available in 200, 300, and 400 ampere sizes.

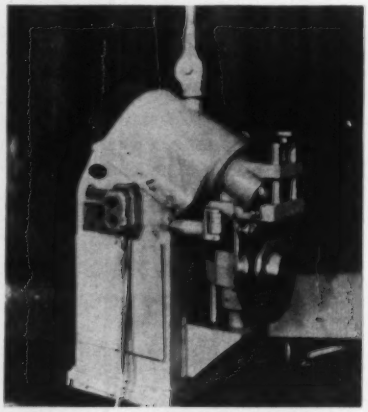
The 180 ampere arcwelder has tap type construction to eliminate moving parts. Use of extra heavy duty copper wire and Class B insulation makes a cooling fan unnecessary. The unit burns all types of ac rods 1/16 through 3/16 in. and does a good job on stainless and cast iron rods, and low hydrogen rods, the firm says.

See them at the American Welding Exposition, or *write* Mid-States Welder Mfg. Co., 6025 S. Ashland Ave., Chicago 36, Ill.

Plates Beveled at Rate Of 11 ft per Minute

PLATES are beveled at the rate of 11 ft per minute by a Pullmax unit. The slightly grooved or serrated cutting surface obtained is suitable for making strong, high quality welding joints.

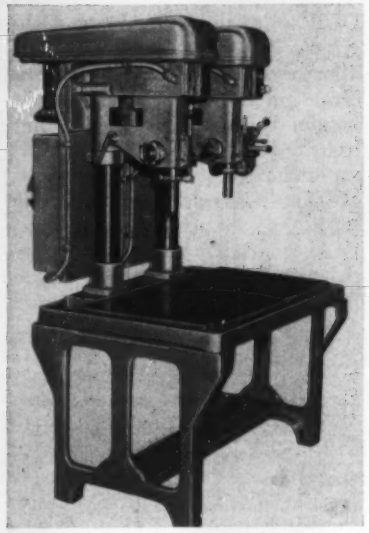
Three models are available: No. 1—30 degrees, No. 2—37½ degrees, No. 3—45 degrees. Typical jobs: Beveling cylindrical shapes and large steel pipe sections prior to welding, bevel cutting on nonslip floor plates, and beveling mild curved shapes.



See it at the American Welding Exposition, or *write* American Pullmax Co. Inc., 2455 N. Sheffield Ave., Chicago 14, Ill.

Capacity of Drilling Units 1 in. in Mild Steel

CAPACITY of the No. 20, Buffalo drilling machine is 1 in. in mild steel. The controls are designed for easy operator access. The five step pulleys are geometrically progressed to permit belt changing from step to step without adjusting the motor bracket.



The spindle return spring can be adjusted by hand without tools. The depth stop bar is equipped with an easily adjustable collar for sensitive or power feed. Feed sleeve adjustment is provided.

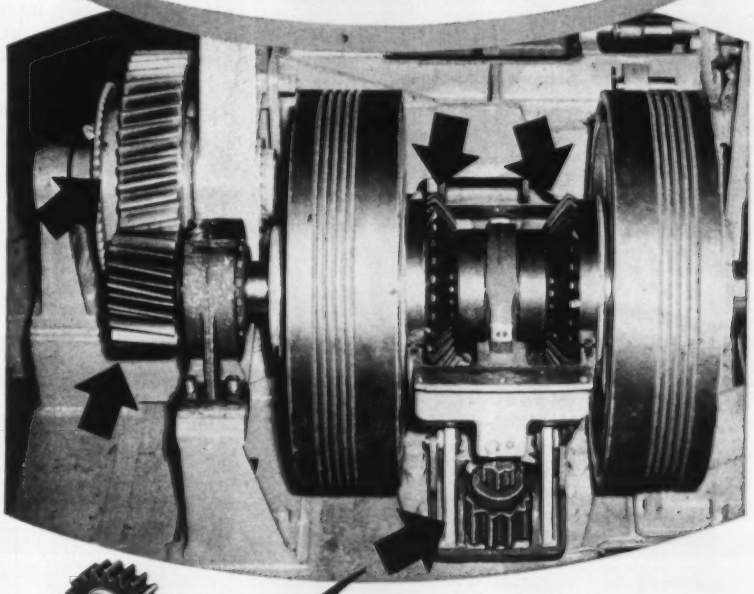
Available models: Floor drill, standard bench drill with tilting table, and pedestal and production bench drills with one to six spindles. Options include power feed, variable speed drive, and a head raising device. A table raising device and a production oil trough table are available for bench or floor models.

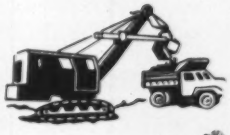
For further information, *write* Buffalo Forge Co., 490 Broadway Ave., Buffalo 5, N. Y.

Bar Milling Unit Mills Four Surfaces in a Pass

SUPERIOR surface finish and low production cost are advantages of a bar milling machine for nonferrous metals such as hot rolled copper. The unit, a Torrington Model

Do You have requirements for "Special Gears?"





CHECK with FAIRFIELD!

"Fairfield has furnished us with bevel and spur gears for many years and we are highly satisfied with their product," states one of America's best known makers of shovels, cranes, and draglines in referring to the above picture. Each gear (*see arrows*) is precison produced to match this builder's specifications for *plus value* quality.

Making gears to meet exacting specifications is our business. The special or unusual requirements you have for design, size, finish, tolerances, materials, and heat treatment are often "standard" at FAIRFIELD. Here, every facility needed is available for production of fine gears EFFICIENTLY, ECONOMICALLY. *LARGE or SMALL, your inquiry will receive prompt attention.* CALL or WRITE.

FAIRFIELD MANUFACTURING CO., INC.
2313 South Concord Road • Lafayette, Indiana
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Gears and Differentials for FINE GEARS Made to Order for:

TRACTORS • HEAVY DUTY TRUCKS • AGRICULTURAL MACHINERY • POWER SHOVELS AND CRANES
MINING MACHINES • ROAD GRADERS • BUSES • STREET SWEEPERS • INDUSTRIAL LIFT TRUCKS

1949, handles material widths up to 6 in. It mills four surfaces in one pass. The unit is set up for a maximum 1 in. thickness and a maximum cross sectional area of 3 sq in. at speeds from 33 to 99 fpm. The company says it can be adjusted to handle a wide range of stock sizes in both width and thickness within those specifications.

Unit construction permits all operating units to be used together or selectively for special conditions. Open throat design makes it simpler to set up the milling units and observe the material as it passes from station to station. In case of accidental jamming, the bar can easily be removed at the front of the machine.

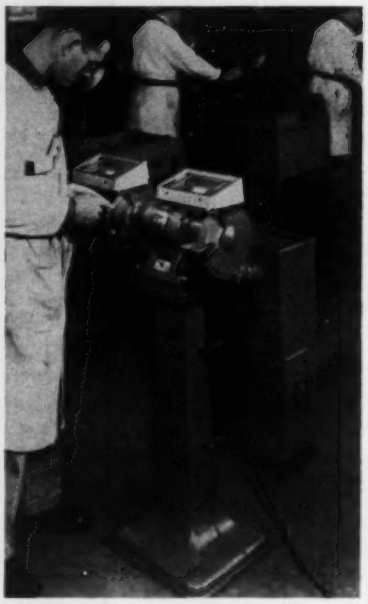
Milling cutters are inserted tooth types—each driven from a separate motor. Adjustable edge guides are provided throughout the machine for center pass operation. At the exit end, a deburring unit with motor driven milling cutters removes burrs and slightly bevels all four corners of the bar. The unit may be driven by ac or dc motors. A special, hooded exhaust system removes chips.

For further information, *write* Machine Div., Torrington Mfg. Co., Torrington, Conn.

Grinder Designed for Odd Shaped and Long Stock

DESIGN of the 7 in., ½ hp Delta grinder is aimed at convenient handling of odd shaped and long stock. Oval end bell hubs provide top to bottom thickness for rigidity and front to back thinness for easy work manipulation.

Safety features include Twin-Lite shields to protect the operator's eyes, removable steel plates covering wheel sides, adjustable spark deflectors, 2½ in. diameter cupped wheel flanges, and cast iron guards with integral dust chutes.



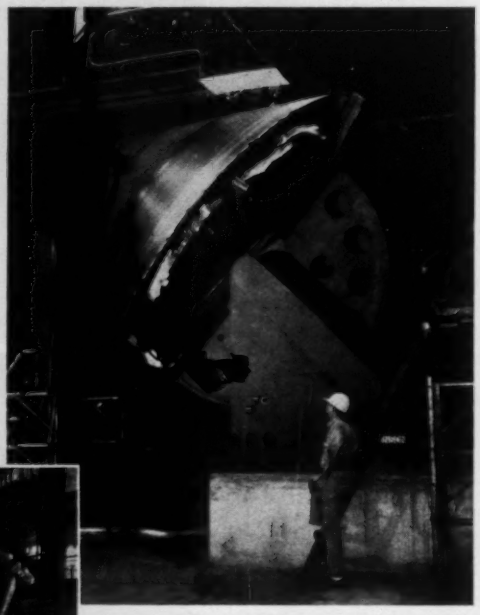
The single phase motor is a capacitor start, 115/230 volt, ½ hp unit with double sealed ball bearings. An extra seal keeps abrasive dust out. It's available in 1725 and 3450 rpm models. Three phase motors are also available for the grinder.

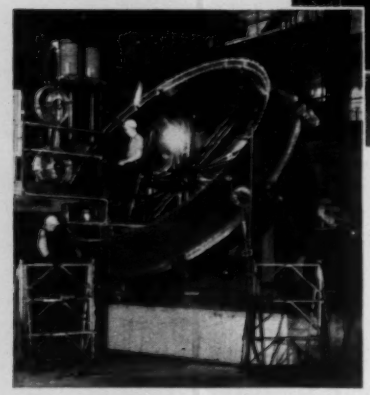
For further information, *write* Delta Power Tool Div., Rockwell Mfg. Co., 485 N. Lexington Ave., Pittsburgh 8, Pa.

PROFITS are built on DEPENDABILITY

ARONSON Model G3500 "EXCALIBUR" Gear Driven Positioner is used by a large Eastern steel producer for hard-facing bell hoppers for blast furnaces. "EXCALIBUR" provides the greatest precision and economy in the handling of large workpieces.

"EXCALIBUR" is not a special job machine, but a Positioner that will handle 90% of those jobs you now wrestle around the shop floor with profit eating cranes.





"Excalibur" opens production doors that are closed to your competitors. "Excalibur" has been designed to handle almost every kind of weldment up to 175 tons at lowest possible shop cost — with the dependability that profits are built on.

ARONSON BUILDS THE MOST COMPLETE LINE OF POSITIONERS
. . . WITH CAPACITIES RANGING FROM 25 POUNDS TO 600 TONS

Universal Balance® Positioners • Bench Turntable Positioners • Gear Driven Positioners
Headstock-Tailstock Positioners • TracTred® Turning Rolls • Turntables
Fully Automatic Positioners • Geared Elevation Positioners • Magnetic Welding Clamps

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ARCADE, NEW YORK

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ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

1901 1961

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United for Sixty Years

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

Subsidiaries: Adamson United Co., Akron, Ohio; Stedman Foundry and Machine Co., Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

Switching from aluminum to Zamak sliced casting costs in half on this Whitehead ball bearing bobbin holder. And with seven zinc die castings accounting for all the major working parts, overall costs dropped a neat 12%.

This high volume item is found on spinning frames in cotton mills—it's designed to take twenty to thirty years of rugged, day-in day-out service. Yet by using Zamak instead of aluminum, the wall thickness of certain parts was reduced from .065" to .050". This resulted in a decrease in material cost with no loss in strength. Whitehead Die Casting plans to bring their costs down still further by going to wall thicknesses of .032"—with the toughness of the parts still unaffected as far as their performance goes.

Besides the healthy cost savings directly related to the reduced wall sections, Zamak also provides Whitehead with a familiar success story—"faster and more economical production . . . longer die life . . . less rejects." Zamak gives you more for less — — —

WHITEHEAD BALL BEARING BOBBIN HOLDER

AWARD OF MERIT

THE NEW JERSEY ZINC COMPANY'S "DIE CASTING OF THE YEAR" COMPETITION

CASTING COSTS CUT 50%

are YOU getting your METAL'S WORTH?

HORSE HEAD® SPECIAL ZINC AND HORSE HEAD ZAMAK ARE PRODUCED BY

THE NEW JERSEY ZINC COMPANY

160 FRONT STREET • NEW YORK 38, N. Y.

DEVELOPERS OF THE ONLY STANDARD ZINC DIE CASTING ALLOYS IN USE TODAY

HORSE HEAD PRODUCTS

NEW literature

Write directly to the company for a copy

Three Way Aluminum Selector

Aluminum alloy sheet, coil, and blank data are summarized in a Three-Way Design Data file. The principal selector chart outlines detailed data on ten most used alloys, including applications, strengths, thermal and electrical conductivity, density, specific gravity, melting range, and manufacturing limits. The basic manufacturing data are augmented with reference charts on weights, tolerances, fabrication characteristics, available finishes, hardening properties, and embossing designations. Fairmont Aluminum Co., Fairmont, W. Va.

Temperature Controls

Brief descriptions and specifications are given for 17 different types of temperature controls in an eight page brochure (MC-203). Fenwal Inc., Ashland, Mass.

Data on Multispindle Automatics

A job portfolio gives complete technical details for efficient metal cutting jobs run on Warner & Swasey multispindle automatics. Dozens of different workpieces and tooling applications are illustrated with line drawings and complete setup sheet data. Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio.

Chromate Conversion Coatings

"Technical Data Chart on Chromate Conversion Coatings" and "Practical Cyanide Zinc Plating" are the titles of brochures available from Allied Research Products Inc., 4004 E. Monument St., Baltimore 5, Md.

Laminated Plastics

An eight page catalog aids in selecting and applying laminated plastics and vulcanized fiber for electrical, electronic, and mechanical components. General data give suggested applications, corresponding NEMA grades, military specifications, color, forms, and sizes. Taylor Fibre Co., Norristown, Pa.

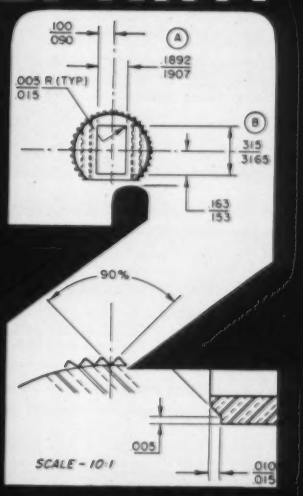
"Computa-Guide"

The "Computa-Guide," complete with instruction booklet, determines the performance of RF doublers and triplers, as well as straight-through amplifier electron tubes. Advertising Dept., Amperex Electronic Corp., 230 Duffy Ave., Hicksville, N. Y.

Aluminum Hard Coatings

Hard-anodized coatings for imparting wear resistance to aluminum alloys are described in a seven page brochure. The report details physical properties and results of complete hardness studies. It illustrates the effect of coating on part dimensions, and gives specific cost figures. Allen Aircraft Products Inc., Ravenna, Ohio.

BLUEPRINT FOR



Transforming these lines and numbers into the functional reality of a sintered brass brush holder for small electric actuator motors took teamwork. A design engineer conceived it, and a metal powder fabricator brought it to fruition—at a 65% cost saving over the previous method of manufacture.

It might not have been this way. Despite a design engineer's careful planning, his blueprint could be a neatly drawn recipe for an ulcer—when looked at by a metal powder fabricator aware of the advantages and limitations of his art. Often, a fabricator has little choice but to turn out a part he knows could be made infinitely better—could be made with increased reliability, more wearability, less machining and lower costs.

Working together, the metal powder fabricator and design engineer make economical mass production of critical parts a reality. And we also mean "critical" in the sense that a whole is no better than the quality of its most prosaic part. For more information about the design, application and advantages of nonferrous metal powder parts, write today to The New Jersey Zinc Company for your copy of "Designing For Pressed Brass and Nickel Silver Parts."

Part by KWIKSET POWDERED METAL PRODUCTS
Division of American Hardware Corporation

HORSE HEAD® ATOMIZED NONFERROUS METAL POWDERS ARE PRODUCED BY
THE NEW JERSEY ZINC COMPANY
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DEVELOPERS OF BRASS & NICKEL SILVER POWDERS SETTING TODAY'S STANDARDS
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EUCLID

MATERIAL HANDLING EQUIPMENT

Since 1910

Euclid Cranes and Hoists are produced by specialists to render efficient service with minimum attention.

Their high quality is evidenced by a long list of discriminating purchasers and an impressive record of repeat orders.

Euclid Cranes are available in a large range of sizes and capacities. They include top running, underhung, single or double girder, motor driven or hand power, for all types of industry and service.

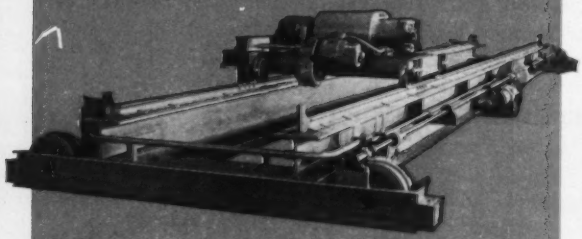
Trolleys are built with one or more hoists as required with any type of control. Top running, underhung, submerged or full revolving trolleys are available.

Special cranes are built to customers' specifications or to plans developed by our engineers.

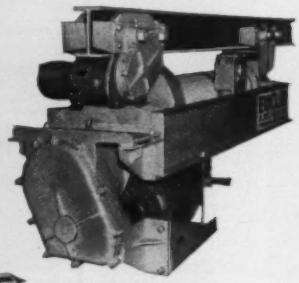
This double girder, cab-operated overhead traveling crane was built for Class 4 service.

It is one of seven Euclid cranes in operation in this warehouse.

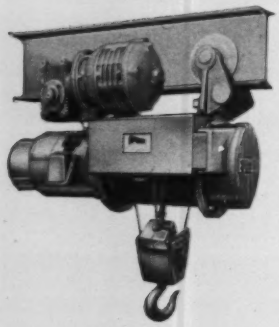
Typical machine tool assembly cranes. Crane in foreground utilized for sub-assemblies. High capacity two hoist crane in background handles small assemblies as well as the completed machines.



Typical double girder general purpose crane composed of standard components. A wide variety of spans and capacities available with floor, cab or remote controls. Modified as desired to meet special requirements.

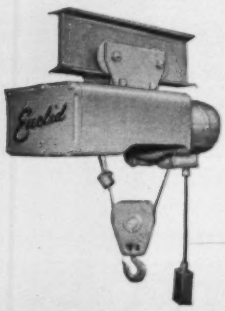


High lift heavy-duty monorail hoist, designed for either motor driven or hand power trolleys, may be provided with cab or floor control in capacities up to 30 tons.



Series H hoists are available in 3 to 15 ton capacities in a variety of mountings to suit specific requirements.

Illustrated is a parallel mounted hoist with cone gear trolley drive.



Euclid Series S Hoists feature quality at competitive prices. Work tested, time proved design. One piece combined gear housing and hoist frame of heavy steel. Easily serviced. Complete motor interchangeability. Capacities from ½ to 6 tons.

Write for the Euclid Crane Catalog

Ask for a Euclid Proposal stating the type and size of crane or hoist in which you may possibly be interested.

The EUCLID CRANE & HOIST CO. Chardon Road Cleveland 17, Ohio

Second Quarter Output: Up 10%

LOOK for second quarter steel production to exceed the first quarter's output by 10 to 12 per cent.

Production in the quarter just ended—19.7 million ingot tons—was up 4 per cent from the 18.9 million tons poured in the fourth quarter of last year, but it still was disappointing. Sharp cutbacks in auto assemblies curtailed demand and held first quarter output below the 21 million tons that market analysts forecast in January.

The second quarter probably won't be as good as originally expected either, again because of disappointing automotive demand. But marketing experts aren't paring their estimates drastically. Their revised guess is 22 million tons, about 8 per cent less than they predicted in January.

BLOCK SEES UPTURN— Joseph L. Block, chairman of Inland Steel Co., Chicago, looks for the industry to produce 22 million to 24 million ingot tons in the second quarter. His estimate for the first half, about 42 million tons, is in line with forecasts that are being made by other steelmakers.

SEASONAL GAINS—Hopes for second quarter improvement are pinned to expectations of a seasonal upturn in consumption, an end to inventory cutting, and increased automotive demand. The upturn will be mostly seasonal in character —better weather spurring demand for products used in construction, road building, farm equipment, air conditioning, and pipelines. Canmakers will need larger quantities of tin plate as they step up production of containers for spring and summer food packs.

AUTO OUTLOOK BRIGHTENS—In addition, automakers can be counted on to give the steel industry more support than they provided in the first quarter. Encouraged by rising sales and diminishing dealer inventories, they're planning to build about 435,000 cars this month, 7 per cent more than they assembled in March. Second quarter schedules are tentatively set for 1.4 million cars, 18 per cent more than were built in the first three months. The biggest increases are being planned by American Motors Corp. (46 per cent), Chrysler Corp. (38 per cent), and Ford Motor Co. (25 to 30 per cent). General Motors Corp. and Studebaker-Packard Corp. will step up production slightly.

It will be several weeks before increased auto output is translated into new orders for steel, but some mills report that they are already receiving requests for April shipment of orders that were ticketed originally for May.

SECOND HALF SURGE?— "It's extremely difficult to judge the acceleration of demand that we may get in the next three quarters," cautions a top market analyst of a major steel company. "After so many months of disappointment, we're likely to underestimate our recovery potential—particularly in the second half."

To match last year's output of 99.3 million ingot tons, the industry will have to operate at 70 per cent of capacity for the rest of the year. That's unlikely, analysts believe, but they still think chances are good for 93 million tons—41.7 million in the first half and 51.3 million in the second.

OUTPUT EDGES UP— Look for ingot production in the week ending Apr. 15 to slightly exceed the 1,648,000 tons that STEEL estimates the industry poured in the week ended Apr. 8. Output then was 1 per cent above the previous week's.

WHERE TO FIND MARKETS & PRICES

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Autos Are Biggest Steel Customer

THE auto industry continued in 1960 to be the steel industry's biggest customer by taking 20.53 per cent of mill shipments of finished products. In 1959, the auto industry got 20.48 per cent.

Service centers continued to be the second best customer, according to an annual summary by the American Iron & Steel Institute. They took 17.54 per cent of mill shipments in 1960 compared with 18.81 per cent in 1959.

The next five leading market groups (in descending order)—construction, containers, machinery (except electrical), contractors' products, and converters—maintained the same rankings in 1960 as they had in 1959.

Exports accounted for 3.60 per cent of 1960 mill shipments of finished steel compared with 2.03 in 1959.

Eight market groups took less tonnage than they did in 1959. Declines were registered by converters, forgings, service centers, shipbuilding, oil and gas drilling, agricultural, machinery (except electrical), and appliances.

Total tonnage of finished steel shipped from mills was up 1,772,151 net tons (2.55 per cent) in 1960. Alloy and stainless steels declined 245,004 tons, but carbon steels rose 2,017,155 tons.

The leading product tonnagewise in 1960 was cold rolled sheets.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

Distribution of Finished Steel in 1960 by Market Classification

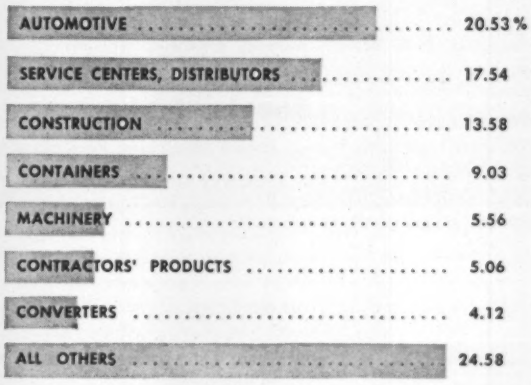
Net tons of mill shipments of all grades, including carbon, alloy, stainless, and heat resisting steel

Market Classification	Ingots, Blooms, Billets, Slabs, Sheet Bars, & Seamless Tube Rounds	Skelp	Wire Rods	Structural Shapes (Heavy)	Steel Piling	Plates	Standard Rails (Over 60 lb)	Rails (All other)	Joint Bars	Tie Plates
Converters, Processors	316,800	113,537	251,658	902	.....	122,519	1,379	4	731	202
Forgings (except automotive)	457,117	.....	.....	21	.....	10,152	.....	.....	.....	.....
Bolts, Nuts, Rivets, Screws	12,095	.....	282,799	158	.....	8,414	.....	.....	.....	.....
Service Centers, Distributors	92,082	.....	87,237	881,180	33,302	870,061	6,420	7,676	1,200	331
Construction, Maintenance	167,550	2,341	24,851	2,764,760	362,955	1,752,601	44,389	17,517	2,160	5,594
Contractors' Products	5,836	.....	20,503	22,648	3	163,067	.....	.....	.....	.....
Automotive	423,242	.....	64,988	43,226	.....	298,621	.....	.....	.....	.....
Rail Transportation	22,209	.....	56	333,506	221	685,456	498,418	10,865	19,272	104,326
Shipbuilding, Marine Equipment	6,010	.....	16	78,347	1,700	458,193	18	280	1	.....
Aircraft	22,925	.....	126	887	.....	5,759	.....	.....	.....	.....
Oil & Gas Drilling	22,302	.....	1,105	18,307	50	24,565	.....	.....	.....	.....
Mining, Quarrying, Lumbering	2,367	.....	31	31,441	629	55,742	12,067	5,507	568	2,223
Agricultural	7,695	.....	9,995	42,087	.....	92,156	.....	.....	.....	.....
Machinery, Indust. Equip., Tools	110,137	.....	129,759	210,013	.....	1,076,281	2,325	3,865	165	362
Electrical Machinery & Equip.	6,204	.....	16,170	22,588	191	167,747	.....	.....	.....	.....
Appliances, Utensils, Cutlery	1,476	.....	612	904	.....	11,414	.....	.....	.....	.....
Other Domestic, Commercial Equip.	698	.....	16,037	3,710	.....	22,852	.....	2	.....	.....
Containers	3,753	.....	1,002	796	.....	20,764	.....	.....	.....	.....
Ordnance & Other Military	15,505	.....	2,086	17,545	768	55,566	.....	10	.....	.....
Export	72,797	14,326	9,080	253,971	23,041	98,626	102,896	972	2,805	11,226
Unclassified	4,028	.....	84	108,835	.....	131,031	.....	.....	.....	.....
Totals	1,772,828	130,204	918,195	4,835,832	422,860	6,131,587	667,912	46,698	26,902	124,264

Market Classification	Mechanical Tubing	Pressure Tubing	Wire, Drawn	Nails & Staples	Wire, Barbed & Twisted	Woven Wire Fence	Bale Ties & Baling Wire	Black Plate	Tin & Terne Plate (Hot dipped)	Tin & Terne Plate (Electrolytic)
Converters, Processors	12,309	2,273	875,765	2,704	15	17	2	12,650	70	3,583
Forgings (except automotive)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bolts, Nuts, Rivets, Screws	.....	.....	237,246	49	.....	.....	.....	55	.....	.....
Service Centers, Distributors	116,160	60,376	183,946	289,484	45,513	100,231	59,450	84,656	14,513	113,794
Construction, Maintenance	4,618	9,707	72,490	6,892	1,173	2,237	36	4,327	348	2,447
Contractors' Products	24,308	10,846	66,425	1,054	25	28	.....	28,339	461	4,895
Automotive	148,864	13,549	213,707	269	.....	.....	.....	10,884	4,148	26,522
Rail Transportation	2,504	2,352	2,974	1,928	725	1,082	.....	161	47	778
Shipbuilding, Marine Equipment	764	1,280	1,386	43	.....	.....	.....	39	.....	20
Aircraft	2,111	102	774	2	.....	.....	.....	.....	.....	.....
Oil & Gas Drilling	13,123	1,441	78	5	.....	.....	.....	.....	.....	.....
Mining, Quarrying, Lumbering	2,285	86	2,266	161	.....	48	.....	8	.....	.....
Agricultural	20,938	331	9,831	72	40	59	.....	128	8	955
Machinery, Indust. Equip., Tools	179,182	52,496	177,263	2,994	1	.....	.....	11,397	3,224	13,077
Electrical Machinery & Equip.	7,589	162	35,763	219	.....	.....	.....	3,641	3,357	6,620
Appliances, Utensils, Cutlery	8,985	1,942	50,159	113	.....	.....	.....	43,188	7,962	18,983
Other Domestic, Commercial Equip.	16,272	58	263,841	704	.....	.....	2	74,010	7,211	25,629
Containers	1,975	.....	47,289	5,448	33	.....	1,740	256,328	246,116	4,476,000
Ordnance & Other Military	4,220	3,499	1,537	40	28	2	1	49	446	728
Export	7,632	1,617	17,687	608	298	173	170	46,338	102,075	381,471
Unclassified	188,743	109,135	179,504	7,613	.....	.....	1,306	.....	.....	.....
Totals	762,582	271,252	2,439,931	320,402	47,851	103,877	62,707	576,198	389,986	5,075,502

Tables compiled by STEEL from American Iron & Steel Institute figures.

Sizing Up the Steel Markets — 1960



Distribution of Alloy and Stainless Steel

(1960 Mill Shipments of Finished Material)

Market Classification	Alloy Other Than Stainless (Net tons)	Stainless and Heat Resisting (Net tons)
Converters, Processors	76,903	44,267
Forgings (except automotive)	280,933	6,896
Bolts, Nuts, Rivets, Screws	69,938	5,224
Service Centers, Distributors	508,563	228,543
Construction, Maintenance	183,547	8,887
Contractors' Products	14,274	15,698
Automotive	1,344,709	78,163
Rail Transportation	236,546	2,259
Shipbuilding, Marine Equip.	75,447	1,580
Aircraft	43,194	13,530
Oil & Gas Drilling	115,324	434
Mining, Quarrying, Lumbering	24,881	213
Agricultural	22,989	222
Machinery, Indust. Equip., Tools	531,312	34,516
Electrical Machinery & Equip.	456,713	10,675
Appliances, Utensils, Cutlery	13,682	38,059
Other Domestic, Commercial Equip.	18,847	11,062
Containers	23,726	1,109
Ordnance & Other Military	58,125	2,057
Export	143,123	41,281
Unclassified	138,665	33,852
Totals	4,381,441	578,527

Track Spikes	Wheels	Axles	Bars, Hot Rolled (And light shapes)	Bars, Concrete Reinforcing	Bars, Cold Finished	Bars, Tool Steel	Standard Pipe	Oil Country Goods	Line Pipe	Market Classification
89	.....	.....	211,705	2,568	3,380	690	14,594	4,608	4,866	Converters, Processors
.....	.....	.....	368,404	.....	3,723	1,790	.....	.....	.....	Forgings (except automotive)
8	.....	.....	397,601	.....	39,305	20	214	.....	.....	Bolts, Nuts, Rivets, Screws
4,457	38	.....	1,143,865	440,885	428,445	15,097	1,455,542	978,431	629,636	Service Centers, Distributors
1,942	7,263	2,513	604,683	1,005,386	8,946	831	136,956	17,614	1,820,057	Construction, Maintenance
3	.....	.....	145,608	46,572	16,970	6	121,979	.....	12,690	Contractors' Products
.....	.....	.....	1,971,998	71	313,570	3	2,001	.....	463	Automotive
36,885	222,213	106,249	235,033	261	5,260	.....	5,731	.....	424	Rail Transportation
.....	100	4	29,201	245	4,349	.....	5,964	.....	6,838	Shipbuilding, Marine Equipment
.....	6	.....	22,393	.....	7,696	37	122	.....	57	Aircraft
.....	48	.....	90,232	.....	6,870	.....	14,525	145,964	46,013	Oil & Gas Drilling
666	1,553	1,100	136,893	907	4,268	363	3,065	827	1,582	Mining, Quarrying, Lumbering
.....	.....	.....	295,270	114	60,251	.....	21,299	.....	1,011	Agricultural
31	8,441	598	727,233	.....	322,189	17,560	25,684	.....	27,040	Machinery, Indust. Equip., Tools
1	125	.....	107,219	.....	32,399	117	281,724	.....	1,469	Electrical Machinery & Equip.
.....	.....	.....	15,331	.....	29,780	.....	5,756	.....	.....	Appliances, Utensils, Cutlery
.....	.....	.....	61,122	176	38,435	28	5,271	.....	702	Other Domestic, Commercial Equip.
.....	.....	.....	4,701	.....	129	.....	70	.....	.....	Containers
2	9	.....	15,619	.....	11,397	68	187	.....	272	Ordnance & Other Military
720	3,514	1,320	77,774	10,128	5,813	133	17,653	49,114	26,093	Export
.....	.....	.....	253,550	707,185	42,158	50,041	13,360	576	110,546	Unclassified
44,804	243,310	111,784	6,915,435	2,214,498	1,385,333	86,784	2,131,697	1,197,134	2,689,759	Totals

Sheets, Hot Rolled	Sheets, Cold Rolled	Sheets, Galvanized	Sheets, Coated (All other)	Sheets & Strip, Electrical	Strip, Hot Rolled	Strip, Cold Rolled	Net Totals	Percentage of Totals	Market Classification
507,566	338,491	8,861	1,413	84	70,347	41,844	2,928,226	4.12	Converters, Processors
.....	.....	.....	.....	.....	16	.....	841,223	1.18	Forgings (except automotive)
56,157	6,470	278	.....	.....	9,943	20,911	1,071,723	1.51	Bolts, Nuts, Rivets, Screws
1,202,975	1,872,102	974,365	20,000	4,136	158,125	104,119	12,479,830	17.54	Service Centers, Distributors
417,627	135,018	180,422	7,698	1	59,531	8,006	9,663,487	13.58	Construction, Maintenance
681,061	931,097	1,083,653	14,457	845	88,964	109,701	3,602,044	5.06	Contractors' Products
3,248,908	6,700,813	218,964	144,552	6,037	439,688	315,336	14,610,424	20.53	Automotive
166,439	15,745	26,971	549	2,105	12,671	1,851	2,525,267	3.55	Rail Transportation
12,287	4,416	5,547	3,301	281	1,051	509	622,190	0.88	Shipbuilding, Marine Equipment
4,265	3,510	317	43	292	3,360	2,704	77,488	0.11	Aircraft
16,651	1,767	336	5	32	650	155	404,224	0.57	Oil & Gas Drilling
11,533	4,146	792	57	57	4,204	620	288,062	0.41	Mining, Quarrying, Lumbering
186,408	60,373	129,005	1,922	.....	61,226	2,311	1,003,485	1.41	Agricultural
363,844	256,198	35,111	8,196	7,442	126,367	59,460	3,957,935	5.56	Machinery, Indust. Equip., Tools
206,508	496,016	51,349	12,275	467,042	62,485	89,325	2,078,305	2.92	Electrical Machinery & Equip.
117,831	1,147,401	149,100	21,116	10,769	22,023	94,820	1,759,665	2.48	Appliances, Utensils, Cutlery
140,687	1,027,788	92,194	7,944	5,448	34,329	113,545	1,958,695	2.75	Other Domestic, Commercial Equip.
431,625	606,566	48,462	1,343	.....	149,888	124,938	6,428,966	9.03	Containers
12,242	12,710	1,741	46	1,063	2,047	5,350	164,783	0.23	Ordnance & Other Military
203,908	845,634	49,528	16,286	61,923	23,782	21,686	2,562,818	3.60	Export
2,226	.....	.....	.....	263	1,583	208,611	2,120,378	2.98	Unclassified
7,990,748	14,466,261	3,056,996	261,203	567,820	1,332,280	1,325,802	71,149,218	100.00	Totals

Automotive Steel Demand Seen Rising in Midwest

Projected increases in automobile assemblies this quarter (more than originally planned) are encouraging steelmakers in the Midwest to anticipate a substantial pickup in automotive specifications shortly.

Republic Steel Corp., Cleveland, reports it already has felt an upswing in auto business, L. S. Hamaker, vice president of marketing, pointing out that Chrysler Corp. had increased its buying about 25 per cent from earlier-in-the-year levels, and that Ford Motor Co. and General Motors Corp. are expected to do likewise.

Chicago district steelmen say the increased output of cars has not yet been translated into a surge in steel buying. However, with the automakers taking steel only as they need it, expanded assembly line activities must sooner or later result in bigger steel shipments.

Midwestern steel mills are still finding nothing spectacular about the April order picture. In fact, because the pace of demand is slower than had been anticipated, many executives decline to guess what May and June volume will be. They say they are not getting the normal seasonal upturn.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 137 & 138

Demand for hot and cold rolled sheets shows little gain over that of the last couple of weeks. However, sellers are anticipating a pickup in automotive requirements shortly, a development that could tighten up mill shipments sufficiently to stimulate buying interest in other areas of consumption.

Hot rolled sheet delivery promises range three weeks, and those on cold rolled two to five weeks. Deliveries on galvanized sheets extend five to eight weeks, though consumers can do better on occasion. Electrical sheets are being offered within three to five weeks, and enameling stock within a month. In general, galvanized sheets seem to be the only product for which deliveries are stretching out.

Most of the current slight bulge in demand is described as seasonal. Still, sheetmakers are encouraged by the fact that the slightly better buying has developed despite the continued lag in automotive and appliance requirements.

Several producers have lowered their base price on low carbon strip from $7.525 per 100 pounds to $7.425. Also they have reduced base tonnages for quantity and packaging extras on high carbon and low carbon strip. The rest of the industry is expected to take similar action.

It's understood the packaging base has dropped to 3000 lb from 10,000 lb. The new price for quantities of 2000 to 2999 lb is reported to be 10 cents per 100 lb, on 1000 to 1999 lb it's 20 cents. The base quantity on low carbon strip has reportedly dropped from 20,000 lb to 6000 lb. From 3000 to 5999 lb, the charge now is $1, from 2000 to 2999 lb it's $1.10, and from 1000 to 1999 lb, it's $3.20. Similar adjustments are reported on flat wire.

Looking ahead, most sheetmakers predict their second quarter

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THE FOUNDRY SUPPLY CO., INC.
Minneapolis

shipments will top the first quarter's by 10 per cent. They're pinning their hopes on three factors: 1. A seasonal spurt in consumption. 2. The end of inventory liquidation. 3. Increased auto demand.

Distributors . . .

Prices, Page 141

Modest gains in sales continue to be reported by the steel service centers. At some points, notably at Los Angeles, sales are said to be 20 to 25 per cent above those in February with inquiries up proportionately. March business was ahead of February's not only because of the longer month but because daily average volume was up.

Some distributors think April buying will show further gains on a daily basis. The betterment is ascribed to seasonal influences and also the fact that consumers are finding mill deliveries of some items less flexible. Distributors' stocks are well balanced but with consumers' calls for tonnage increasing, the service centers are ordering a little more actively from the mills.

Steel Bars . . .

Bar Prices, Page 136

While hot rolled carbon steel bar deliveries range from one to four weeks, depending on rolling schedules, the average delivery is not as easy as it was two or three weeks ago. There appears to be no particular pressure for bars from any consuming direction, but total order volume is somewhat heavier than it was a few weeks back.

Much the same situation prevails with respect to cold finished bars. Business continues spotty, and there's no particular change in delivery promises. Various grades of cold drawn can be delivered within two weeks, with some items being available from stock.

January Foreign Trade In Mill Products Off

Both exports and imports of steel mill products in January were down from a year ago, but imports exceeded exports by a small margin.

Data compiled by the American Iron & Steel Institute from Commerce Department reports show exports in the month were 132,383 net tons, valued at $30,040,053, vs. 157,608 tons, valued at $34,098,647 in the like 1960 month.

At the same time, imports totaled 145,206 tons, valued at $19,924,-805, against 463,276 tons, valued at $63,065,705 in January, 1960.

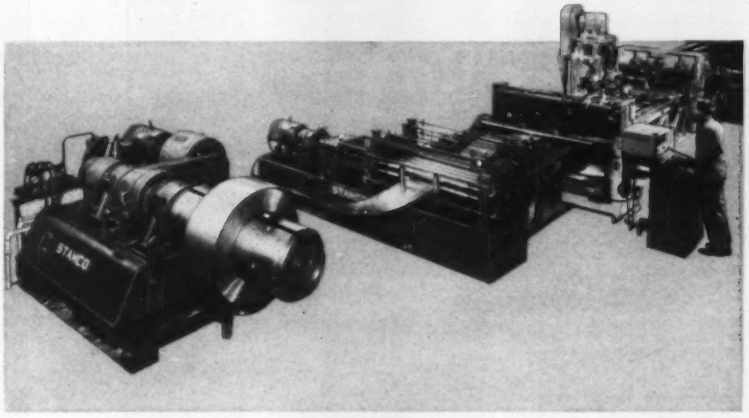
Total exports of iron and steel products (including fabricated items, iron products, and ferroalloys) in the month were 206,875 net tons, valued at $43,063,870. That compares with 190,377 tons, valued at $45,817,835 in the same month last year.

Imports of all iron and steel items (including fabrications, iron products, and ferroalloys) totaled 174,841 tons, valued at $26,882,-121. That compares with 518,372 tons, valued at $73,691,865 in the same month of 1960.

Pig iron imports in the month totaled 4955 tons, coming in as follows: At Michigan ports from Canada, 1897 tons; at Philadelphia from Spain, 2643 tons; at Los An-

The answer is **Stamco**

for equipment that reduces cost in slitting and shearing operations



The installation of Stamco equipment will help you realize savings in three important areas: inventory investments, time and labor, and reduced waste.

This new shear line is designed to accommodate stock up to 14 gauge, in widths to 48 inches, and in coils weighing a maximum of 20,000 pounds. Accuracy can be held to plus or minus 1/32 inch. It is set up to cut lengths from 14 inches to any maximum length.

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New Bremen, Ohio, U.S.A.

Slitting and Coiling Lines • Cut-to-Length Lines • Flying Shear Lines • Power Squaring Shears • Continuous Process Lines Ferrous and Non-ferrous Mill Equipment

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R. P. Popp, 18450 Livernois, Detroit 21, Michigan
R. P. Popp, 101 Investment Building, Pittsburgh 22, Pa.
I. W. Spraitzar, 159 Main Street, Chatham, New Jersey
W. E. Heineman, 122 West Burlington Ave., LaGrange, Illinois
W. H. Millan, 11955 Shaker Boulevard, Cleveland 20, Ohio

geles from Union of South Africa, 281; at San Francisco from Union of South Africa, 56; at San Francisco from Australia, 78. In January, 1960, 14,740 tons were imported.

Pig iron exports amounted to 46,878 tons, of which 20,830 went to Italy and 25,977 went to Japan. In January, 1960, exports of pig iron totaled only 2370 tons.

Scrap exports in January this year amounted to 568,379 tons vs. 356,020 in the same month last year. The largest tonnage, 367,298, was taken by Japan. Scrap imports in the period amounted to only 18,750 tons, coming almost entirely from Canada. In January, 1960, 12,025 tons were imported.

Tubular Goods . . .

Tubular Goods Prices, Page 140

March bookings of continuous weld pipe were 10 per cent higher than had been expected by the mills. One Pittsburgh area producer reports that on Mar. 1 it had only one-sixth of its March forecast booked. Entering April, it had about the same percentage of a larger forecast booked—but it was confident of attaining its objective.

The seasonal upswing is expected to continue into May. One mill reports there's nearly as much tonnage on its books for May as there is for April. That's worth noting, in the opinion of one leading executive, because it may be the start of a trend toward ordering farther ahead.

L. S. Hamaker, vice president-marketing, Republic Steel Corp., Cleveland, reports increased pipe business is developing from more pipeline construction, depleted inventories of oil and gas drillers, and a seasonal upturn in construction.

The latest survey of the Hughes Tool Co. shows active rotary oil rigs in the U. S. at 1580, down 76 from the preceding weekly survey.

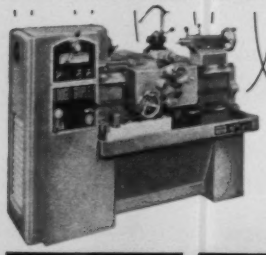
Dalmotor Div., Yuba Consolidated Industries . . . "used in model shop for turning, facing and boring all sorts of experimental parts."

Raytheon Manufacturing Co. . . . "used for turning, facing and boring operations on brass, aluminum and steel workpieces."

Over an extremely wide range of American industry . . . for tooling, production, maintenance and experimentation . . . the Lodge & Shipley 1307 HI-TURN (10") Lathe is making a record of true economy. With literally dozens of big lathe features, the HI-TURN is still priced substantially below many lathes having fewer features, less horsepower and lighter construction.

Turn your attention to HI-TURN. Find out why these and many other lathe users are ordering and reordering HI-TURN Production and Tracer Lathes to replace or supplement larger, far more costly lathes. For complete details, request Bulletin 331, The Lodge & Shipley Co., 3070 Colerain Ave., Cincinnati 25, Ohio.

THEY'RE ALL TURNING TO Hi-Turn



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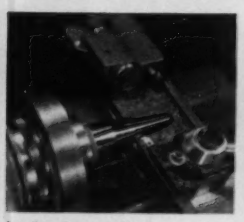
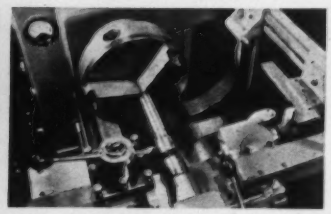
Rocketdyne Div., North American Aviation . . . "held OD turning to a tolerance of .0003"."



Leading glass manufacturer . . . "unheard of economy, ease and speed of production" on machining and reworking glass bottle tooling.



Indiana Gear Works . . . has earned a reputation of "excellent for high production."

Bethlehem to Fabricate Building Bars in West

Bethlehem Steel's Pacific Coast Div. is re-entering the fabricated reinforcing bar business in the San Francisco area after an absence of about six years.

The division has constructed a 36,000 sq ft building at its South San Francisco steelmaking plant, and while the facility's capacity has not been announced, indications are it will be able to handle about 2500 tons of fabricated bars monthly. Fifty persons will be employed in the new shop, which is expected to begin operations May 1.

Equipment will cut, shear, and spiral reinforcing bars delivered from the company's steelmaking plant for heavy construction jobs in the San Francisco Bay area.

Fabricated reinforcing bars are among the "hottest" competitive items in the Pacific Coast market, and re-entry of Bethlehem's area division means increased competition for foreign bars which have been taking a substantial part of the market.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 137

Producers of reinforcing bars are increasing mill operations as construction needs bulge seasonally. More mills are devoting rolling time to rebars, and order books are beginning to swell. Wire mesh for con-

struction is expected to soon begin moving actively. Releases against orders on books are beginning to trickle in to the mills as weather conditions moderate and building operations get underway.

Washington State recently awarded the contract for a $5.5 million section of the Seattle Freeway involving 4700 tons of reinforcing bars, piling, and pipe.

Wire . . .

Wire Prices, Pages 138 & 139

Seasonal quickening in demand for wire and wire products is noted, but volume continues disappointing. Both merchant and manufacturers' wire items are moving a little faster with deliveries available on most products within five weeks. Some merchant wire items are available from stock.

Sellers on the West Coast report sales to aircraft manufacturers and on construction account are up about 20 per cent from February's volume. Construction orders are large. Customers report buying more for stock and less for immediate needs.

Plates . . .

Plate Prices, Page 136

Plate demand is increasing slightly, but, apart from the specialties, not enough business is coming out to extend deliveries.

Most mills can ship sheared and universal plates within ten days to two weeks. Activity in those grades reflects some increase in light tank and boiler work, and in railroad specifications. Shipwork is expected to show improvement this month.

Deliveries on plate specialties average around five weeks, with the needs of the chemical industries most prominent in current demand.

Pig Iron . . .

Pig Iron Prices, Page 141

Merchant pig iron is moving a little faster. The pickup in business is seasonal, reflecting slight operating gains in the foundry industry. Most of the casting shops are buying sparingly, still depending on stockpiles. Also, the foundries are using a high ratio of cast scrap in their melts. However, with cast iron scrap prices rising, a switch to pig iron may not be long deferred.

Cast iron pipe shops in the South are operating three and four days a week. Building construction is expected to spur demand for cast pipe over coming weeks. U. S. Pipe & Foundry Co., Birmingham, is operating one of its five blast furnaces, while Woodward Iron has two out of four stacks on. Two Republic Steel stacks in the district are idle.

Rails, Cars . . .

Track Material Prices, 139

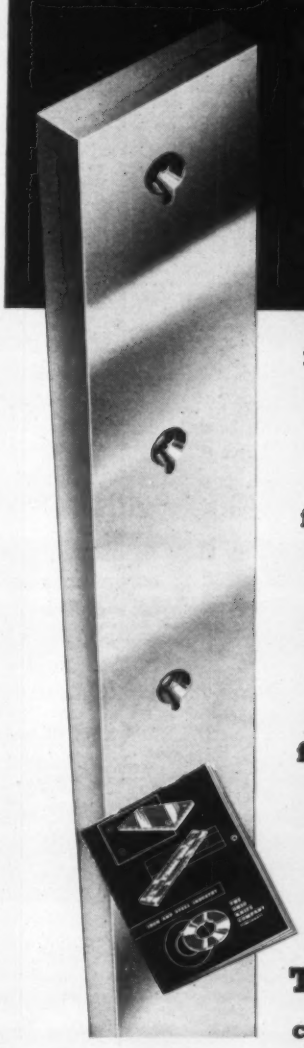
An order for 500 boxcars has been placed by the Missouri Pacific Railroad with the Bessemer, Ala., plant of Pullman-Standard Div., Pullman Inc. The cars will cost an estimated $5 million. Two hundred of them will have loading equipment. Delivery starts June 25 and the order is to be completed by July 25.

Chesapeake & Ohio Railway last week recalled 870 furloughed main-

save time and money

OHIO KNIFE CO.

the one source for all your shear blade requirements



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THE OHIO KNIFE CO.

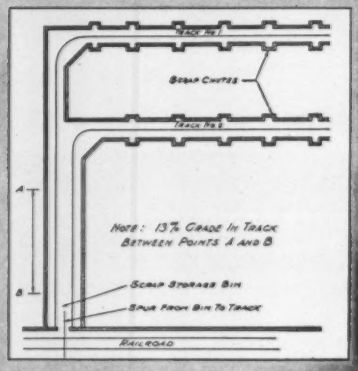
CINCINNATI 23, OHIO

Automatic Steel Scrap Disposal System

Removes Chips and Shavings Without Attendants

View of tracks near beginning of tunnels. Carrier is shown approaching track incline on way to bin with a load.

A load of scrap about to be dropped in bin. Carrier immediately reverses after unloading and starts another trip.



ONE carload of metal chips and shavings is picked up and moved daily with an automatic Cleveland Tramrail magnet-carrying system that operates unattended in two parallel tunnels under metal-working machines.

Each tunnel has its own Tramrail track on which a magnet carrier travels back and forth, picking up scrap that comes down from the machines on floor above. The scrap is conveyed to a bin next to a railroad siding. The system was put into operation in 1942 and has proven an extremely efficient and low-cost method for ferrous scrap disposal.

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CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7885 E. 284th ST., WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

tenance-of-way men for programed work in the track, bridge, building, signals, and communications departments. The road is expecting traffic increases in automobiles, steel, chemicals, and coal the next three months. In anticipation of the opening of the lake shipping season, heavy repairs to hopper cars have been proceeding since Feb. 6 at the road's shops.

New Spiegel Foundry Pig Is Placed on the Market

New Jersey Zinc Co., New York, is offering a new, closely controlled weight, foundry pig, supplementing the 10 lb spiegeleisen pig. The company's automatic casting system has been equipped with a special weighing and selector device that permits closer control of the weight of the iron-manganese alloy pigs, assuring an average of 2 lb of manganese per pig.

The new development is part of a program of expanded activity aimed at broadening application of the iron-manganese alloy in the iron and steel industries. Particular emphasis is being placed on the economic advantages of 10 lb pigs as manganese additions in gray iron and malleable casting production.

The company will shortly start construction of a multimillion dollar electric-arc furnace at its Palmerton, Pa., plant for spiegel production.

Iron Ore . . .

Iron Ore Prices, Page 142

Ore mining operations of Inland Steel Co., Chicago, on four day schedules since last September, returned to full five day schedules Apr. 1. Resuming full operations were three underground mines in Michigan—the Greenwood at Ishpeming, the Sherwood at Iron River, and the Bristol at Crystal Falls—and one in Minnesota at Crosby.

In addition, Pacific Isle Mining Co., a wholly owned subsidiary of Inland, will resume open pit mining operations next month at Mountain Iron, Minn.

Caland Ore Co. Ltd., the Inland subsidiary that's developing the underground mine at Steep Rock Lake in Ontario, and producing ore from an open pit mine, has been on a five day week right along.

Iron Ore Statistics — February, 1961

Iron Ore Inventories—February, 1961

(Gross tons)

	U. S. Iron Ores		Canadian Ores		Foreign	
At Furnaces:	L. Sup.	Other	L. Sup.	Other	Ores	Totals
Start of Month	36,496,404	3,342,629	1,791,245	4,776,698	17,092,537	63,449,513
End of Month in						
Mass., N. Y.	2,976,201	19,310	74,400	176,388	320,229	3,566,528
Pennsylvania	6,909,402	473,602	28,356	193,387	8,145,036	15,749,783
Md., Va., W. Va.	487,852	1,289	.....	1,687,052	3,030,009	5,206,202
Ky., Tenn., Tex.	265,710	151,492	.....	282,737	123,973	823,912
Alabama	871	1,730,336	.....	123,737	3,759,351	5,614,295
Ohio	8,919,126	21,446	789,968	1,726,341	1,257,888	12,714,769
Indiana	6,782,086	29,471	402,849	6,452	73,567	7,294,425
Illinois	4,125,330	55,377	45,476	.....	258,591	4,484,774
Mich., Minn.	2,838,157	.....	267,434	98,307	386,049	3,589,947
Colo., Utah, Calif.	.....	817,554	.....	.....	21,806	839,360
Undistributed	733	2,375	.....	.....	339	3,447
Total	33,305,468	3,302,252	1,608,483	4,294,401	17,376,838	59,887,442
At U. S. Docks	3,369,050	.....	215,495	897,471	2,395,914	6,877,930
Total U. S.	36,674,518	3,302,252	1,823,978	5,191,872	19,772,752	66,765,372
At Canada Furnaces:						
Month's Start	2,412,363	.....	129,632	459,418	96,003	3,097,416
Month's End	2,120,493	.....	123,187	383,907	90,285	2,717,872
Total U. S.-Canada	38,795,011	3,302,252	1,947,165	5,575,779	19,863,037	69,483,244

Iron Ore Consumption—February, 1961

(Gross tons)

	U. S. Iron Ores		Canadian Ores		Foreign	
In U. S.:	L. Sup.	Other	L. Sup.	Other	Ores	Totals
Mass., N. Y.	234,962	3,137	21,516	18,005	13,061	290,729
Pennsylvania	603,676	163,337	915	60,924	505,778	1,334,630
Md., Va., W. Va.	75,558	16,000	.....	239,562	273,734	604,854
Ky., Tenn., Tex.	16,984	31,900	.....	45,764	25,244	119,892
Alabama	.....	316,604	.....	3,215	115,364	435,183
Ohio	786,045	12,150	50,136	127,512	86,873	1,062,716
Indiana	772,461	2,887	79,316	12	19,483	874,159
Illinois	394,721	12,697	.....	.....	27,562	434,980
Mich., Minn.	324,825	.....	30,879	13,745	27,782	397,231
Colo., Utah, Calif.	.....	498,037	.....	.....	7,590	505,627
Undistributed	107	70	.....	.....	29	206
In U. S.						
Blast furnaces	2,037,681	581,670	115,591	216,334	295,658	3,246,934
Steel furnaces	90,604	64,389	1,974	15,290	277,564	449,821
Sintering	1,080,988	410,760	65,129	277,150	529,278	2,363,305
Miscellaneous	66	.....	68	13	.....	147
Total U. S.	3,209,339	1,056,819	182,762	508,787	1,102,500	6,060,207
Total U. S.-Canada	3,501,209	1,056,819	250,645	623,685	1,108,218	6,540,576

Data from American Iron Ore Association.

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Steel Operations Headed Upward

INGOT PRODUCTION is still heading upward—for the fifth straight week. STEEL estimates output in the week ended Apr. 8 rose 1 per cent to 1,648,000 net tons from the 1,632,000 officially reported for the preceding week by the American Iron & Steel Institute. A slight rise is indicated this week (ended Apr. 15), with operations going up at several important producing points.

Joseph L. Block, chairman, Inland Steel Co., Chicago, now thinks first half (1961) ingot output may total around 42 million net tons, with second quarter production running 22 million to 24 million. In the first half of last year, output totaled 60.7 million tons.

• **Pittsburgh** — Steelmaking operations in this district are still pointed upward. Indications are production will rise another point this week. Area output in the latest week of record (ended Apr. 1) was 330,911 tons, up slightly from the preceding week.

• **Philadelphia**—Further buoyancy in steel demand is seen pushing the district steel rate higher. Production in the latest week of record was 245,820 tons, up 8000 tons from the preceding period.

• **Chicago**—The district steelmaking rate is holding at about 63 per cent of the 1960 capacity rating. Activity is a little higher at some plants than at others.

• **Detroit**—Steelmaking operations are still rising here. Area mills anticipate the ingot index may rise to 93-94 this week. So far, the increase is not based on sales as much as it is on stockpiling to meet the greater demand for finished steel expected in May and June.

• **Cleveland** — More open hearths are pouring than a month ago. They were added to meet the seasonal pickup in demand for construction steels and tubular goods. Local mills expect an early rise in automotive buying will boost the ingot rate several points. The latest week of record shows district output at 82,410 tons, up sharply from the 64,891 reported the preceding week.

• **Cincinnati** — Production in this area is running around 66,700 net tons weekly. That's equal to 58.2 per cent of capacity based on the 1960 capacity rating. While order books aren't filling rapidly, steelmen expect a slow, steady rise in output over the next few weeks.

• **Buffalo**—Operations have taken a fairly sharp turn for the better, and there are indications a further rise is in the making. Production has advanced to 36.7 per cent of capacity with the lighting of two additional open hearths. It's reported two more will be added shortly.

• **Birmingham**—The ingot rate continues to move higher. The latest estimate places district operations at 62.9 per cent of capacity against 57.4 per cent the preceding week.

• **Youngstown**—The district ingot rate is estimated at about 34 per cent of 1960 capacity, with one bessemer plant, 24 open hearths, and seven blast furnaces engaged. A changeover at Youngstown Sheet & Tube's revamped, 79 in. strip mill is holding the rate down temporarily.

• **Los Angeles** — Production in the Western District is estimated at about 63 per cent of capacity. Production at one plant slipped about 5.8 per cent last week.

Carpenter Cuts Prices on Cold Heading Wire Items

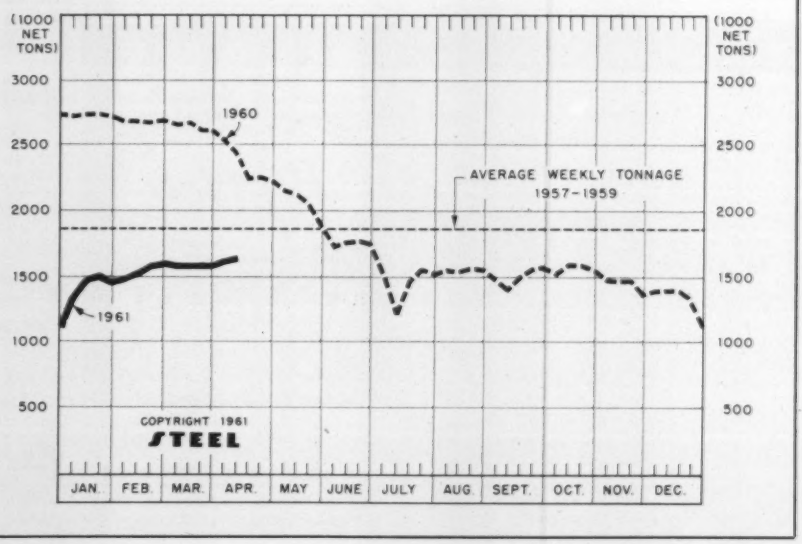
Carpenter Steel Co., Reading, Pa., has effected new price schedules covering stainless Type 410 and 430, copper coated, cold heading wire furnished in coils. They went into effect Mar. 27, and result in reductions in net prices averaging 8 per cent, depending on size and quantity. The company said the reductions were made to make Carpenter competitive with domestic prices currently being quoted.

STEEL INGOT PRODUCTION

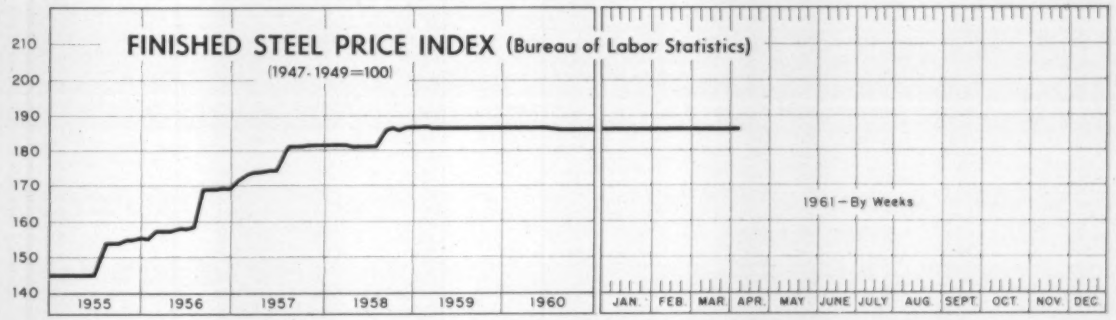
Weeks Ended	Net Tons	Change
Apr. 8	1,648,000*	+ 1.0%
Apr. 1	1,632,000	+ 1.3%
Mar. 25	1,611,000	+ 2.4%
Totals to Apr. 1		
1961	19,958,000	42.1%
1960	34,650,000	

DISTRICTS	Week Ended Apr. 1 Tons‡	Week Ended Apr. 1 Index†	Week Ended Mar. 25 Index†
Northeastern	245,820	92	89
Buffalo	74,963	77	66
Pittsburgh	330,911	80	79
Youngstown	110,488	65	71
Cleveland	82,410	89	70
Detroit	104,917	100	92
Chicago	344,150	92	94
Cincinnati	63,340	84	87
St. Louis	54,128	103	104
Southern	108,396	100	100
Western	123,927	106	108
Industry	1,632,000	87.6	86.5

*Estimated by Steel. †1957-59=100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



Apr. 4, 1961	Week Ago	Month Ago	Mar. Index	Year Ago
186.2	186.2	186.2	186.2	186.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Apr. 4..

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, H.R., Carbon	6.675
Rails, Light, 40 lb	7.292	Bars, Reinforcing	6.335
Tie Plates	6.875	Bars, C.F., Carbon	10.710
Axles, Railway	10.175	Bars, C.F., Alloy	14.125
Wheels, Freight Car, 33 in. (per wheel)	62.000	Bars, C.F., Stainless, 302 (lb)	0.570
Plates, Carbon	6.350	Sheets, H.R., Carbon	6.350
Structural Shapes	6.167	Sheets, C.R., Carbon	7.300
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, Galvanized	8.775
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloys, High Speed, W18 Cr 4, V 1 (lb)	1.895	Strip, C.R., Carbon	9.489
Bars, H.R., Alloy	10.775	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Stainless, 303 (lb)	0.543	Strip, H.R., Carbon	6.250
		Pipe, Black, Buttweld (100 ft)	19.495
		Pipe, Galv., Buttweld (100 ft)	23.098
		Pipe, Line (100 ft)	195.430
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.085
		Tubing, Mechanical, Stainless, 304 (100 ft)	194.268
		Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (Bundles)	7.647
		Nails, Wire, 8d Common	9.433
		Wire, Barbed (80-rod spool)	8.372
		Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	Apr. 5 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	209.10
Index in cents per lb	6.713	6.713	6.713	6.713	5.665

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$128.02
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	60.06
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	59.61
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	61.06
Steelmaking Scrap, GT	39.67	38.67	36.67	33.33	54.17

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Apr. 5 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.98	5.98	5.98	5.975	4.93
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.25
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	5.00
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.80
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.25-6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.60
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.45

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.40	5.375

PIG IRON, Gross Ton	Apr. 5 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$61.00
Basic, Valley	66.00	66.00	66.00	66.00	60.00
Basic, deld., Philadelphia	70.18	70.18	70.18	70.41	63.76
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	60.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	60.50
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.91	64.26
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	60.50
Malleable, Chicago	66.50	66.50	66.50	66.50	60.50
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	215.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$36.50	$34.50	$34.50	$36.50	$54.50
No. 1 Heavy Melt, E. Pa.	43.00	43.00	39.00	34.50	53.50
No. 1 Heavy Melt, Chicago	39.50	38.50	36.50	37.50	54.50
No. 1 Heavy Melt, Valley	38.50	38.50	36.50	40.50	58.50
No. 1 Heavy Melt, Cleve.	35.50	35.50	33.50	36.50	56.00
No. 1 Heavy Melt, Buffalo	31.50	29.50	29.50	34.50	52.50
Rails, Rerolling, Chicago	61.50	61.50	57.50	59.50	72.50
No. 1 Cast, Chicago	44.50	44.50	42.50	47.50	51.50

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$14.125
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	27.00

Steel Prices

Code number following mill point indicates producing company. Key to producers, page 137; footnotes, page 139. Mill prices as reported to STEEL, Apr. 5, cents per pound except as otherwise noted. *Changes shown in italics.*

SEMIFINISHED

INGOTS, Carbon Forging (NT)
Munhall, Pa. U5 ..... $76.00

INGOT, Alloy (NT)
Detroit S41 ..... $82.00
Economy, Pa. B14 ..... 82.00
Farrell, Pa. S3 ..... 82.00
Lowellville, O. S3 ..... 82.00
Midland, Pa. C18 ..... 82.00
Munhall, Pa. U5 ..... 82.00
Sharon, Pa. S3 ..... 82.00

BILLETS, BLOOMS & SLABS Carbon Rerolling (NT)
Bartonville, Ill. K4 ..... $82.00
Bessemer, Pa. U5 ..... 80.00
Buffalo R2 ..... 80.00
Clairton, Pa. U5 ..... 80.00
Ensley, Ala. T2 ..... 80.00
Fairfield, Ala. T2 ..... 80.00
Fontana, Calif. K1 ..... 90.50
Gary, Ind. U5 ..... 80.00
Johnstown, Pa. B2 ..... 80.00
Lackawanna, N.Y. B2 ..... 80.00
Munhall, Pa. U5 ..... 80.00
Owensboro, Ky. G8 ..... 80.00
S. Chicago, Ill. R2, U5 ..... 80.00
S. Duquesne, Pa. U5 ..... 80.00
Sterling, Ill. N15 ..... 80.00
Youngstown R2 ..... 80.00

Carbon, Forging (NT)
Bessemer, Pa. U5 ..... $99.50
Buffalo R2 ..... 99.50
Canton, O. R2 ..... 102.00
Clairton, Pa. U5 ..... 99.50
Conshohocken, Pa. A3 ..... 104.50
Ensley, Ala. T2 ..... 99.50
Fairfield, Ala. T2 ..... 99.50
Farrell, Pa. S3 ..... 99.50
Fontana, Calif. K1 ..... 109.00
Gary, Ind. U5 ..... 99.50
Geneva, Utah C11 ..... 99.50
Houston S5 ..... 104.50
Johnstown, Pa. B2 ..... 99.50
Lackawanna, N.Y. B2 ..... 99.50
LosAngeles B3 ..... 109.00
Midland, Pa. C18 ..... 99.50
Munhall, Pa. U5 ..... 99.50
Owensboro, Ky. C8 ..... 99.50
Seattle B3 ..... 109.00
Sharon, Pa. S3 ..... 99.50
S. Chicago R2, U5, W14 ..... 99.50
S. Duquesne, Pa. U5 ..... 99.50
S. San Francisco B3 ..... 109.00
Warren, O. C17 ..... 99.50

Alloy, Forging (NT)
Bethlehem, Pa. B2 ..... $119.00
Bridgeport, Conn. C32 ..... 119.00
Buffalo R2 ..... 119.00
Canton, O. R2, T7 ..... 119.00
Conshohocken, Pa. A3 ..... 126.00
Detroit S41 ..... 119.00
Economy, Pa. B14 ..... 119.00
Farrell, Pa. S3 ..... 119.00
Fontana, Calif. K1 ..... 140.00
Gary, Ind. U5 ..... 119.00
Houston S5 ..... 124.00
Ind. Harbor, Ind. Y1 ..... 119.00
Johnstown, Pa. B2 ..... 119.00
Lackawanna, N.Y. B2 ..... 119.00
LosAngeles B3 ..... 139.00
Lowellville, O. S3 ..... 119.00
Massillon, O. R2 ..... 119.00
Midland, Pa. C18 ..... 119.00
Munhall, Pa. U5 ..... 119.00
Owensboro, Ky. G8 ..... 119.00
Seattle(6) B3 ..... 140.00
Sharon, Pa. S3 ..... 119.00
S. Chicago R2, U5, W14 ..... 119.00
S. Duquesne, Pa. U5 ..... 119.00
Struthers, O. Y1 ..... 119.00
Warren, O. C17 ..... 119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ..... $122.50
Canton, O. R2 ..... 125.00
Cleveland R2 ..... 122.50
Gary, Ind. U5 ..... 122.50
S. Chicago, Ill. R2, W14 ..... 122.50
S. Duquesne, Pa. U5 ..... 122.50
Warren, O. C17 ..... 122.50

SKELP
Aliquippa, Pa. J5 ..... 5.05
Benwood, W.Va. W10 ..... 5.05
Ind. Harbor, Ind. Y1 ..... 5.05
Munhall, Pa. U5 ..... 5.05
Pittsburgh J5 ..... 5.05
Warren, O. R2 ..... 5.05
Youngstown R2, U5 ..... 5.05

WIRE RODS
AlabamaCity, Ala. R2 ..... 6.40
Aliquippa, Pa. J5 ..... 6.40
Alton, Ill. L1 ..... 6.60
Bartonville, Ill. K4 ..... 6.50
Buffalo W12 ..... 6.40
Cleveland A7 ..... 6.40
Donora, Pa. A7 ..... 6.40
Fairfield, Ala. T2 ..... 6.40
Houston S5 ..... 6.65
Indiana Harbor, Ind. Y1 ..... 6.40
Johnstown, Pa. B2 ..... 6.40
Joliet, Ill. A7 ..... 6.40
KansasCity, Mo. S5 ..... 6.65
Kokomo, Ind. C16 ..... 6.50
LosAngeles B3 ..... 7.20
Minnequa, Colo. C10 ..... 6.65
Monessen, Pa. P7 ..... 6.40
Pittsburg, Calif. C11 ..... 7.20
Portsmouth, O. P12 ..... 6.40
Roebling, N.J. R5 ..... 6.50
S. Chicago, Ill. R2, W14 ..... 6.40
SparrowsPoint, Md. B2 ..... 6.50
Sterling, Ill. (1)N15 ..... 6.40
Sterling, Ill. N15 ..... 6.50
Struthers, O. Y1 ..... 6.40
Worcester, Mass. A7 ..... 6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity, Ala. R2 ..... 5.50
Aliquippa, Pa. J5 ..... 5.50
Atlanta A11 ..... 5.70
Bessemer, Ala. T2 ..... 5.50
Bethlehem, Pa. B2 ..... 5.55
Birmingham C15 ..... 5.50
Clairton, Pa. U5 ..... 5.50
Fairfield, Ala. T2 ..... 5.50
Fontana, Calif. K1 ..... 6.30
Gary, Ind. U5 ..... 5.50
Geneva, Utah C11 ..... 5.50
Houston S5 ..... 5.60
Ind. Harbor, Ind. I-2, Y1 ..... 5.50
Johnstown, Pa. B2 ..... 5.55
Joliet, Ill. P22 ..... 5.50
KansasCity, Mo. S5 ..... 5.60
Lackawanna, N.Y. B2 ..... 5.55
LosAngeles B3 ..... 6.20
Minnequa, Colo. C10 ..... 5.80
Munhall, Pa. U5 ..... 5.50
Niles, Calif. P1 ..... 6.25
Phoenixville, Pa. P4 ..... 5.55
Portland, Oreg. O4 ..... 6.25
Seattle B3 ..... 6.25
S. Chicago, Ill. U5, W14 ..... 5.50
S. San Francisco B3 ..... 6.15
Sterling, Ill. N15 ..... 5.50
Struthers, O. Y1 ..... 5.50
Torrance, Calif. C11 ..... 6.20
Weirton, W.Va. W6 ..... 5.50

Wide Flange
Bethlehem, Pa. B2 ..... 5.55
Clairton, Pa. U5 ..... 5.50
Fontana, Calif. K1 ..... 6.45
Indiana Harbor, Ind. I-2 ..... 5.50
Lackawanna, N.Y. B2 ..... 5.55
Munhall, Pa. U5 ..... 5.50
Phoenixville, Pa. P4 ..... 5.55
S. Chicago, Ill. U5 ..... 5.50
Sterling, Ill. N15 ..... 5.50
Weirton, W.Va. W6 ..... 5.50

Alloy Std. Shapes
Aliquippa, Pa. J5 ..... 6.80
Clairton, Pa. U5 ..... 6.80
Gary, Ind. U5 ..... 6.80
Houston S5 ..... 6.90
Munhall, Pa. U5 ..... 6.80
S. Chicago, Ill. U5, W14 ..... 6.80

H.S., L.A., Std. Shapes
Aliquippa, Pa. J5 ..... 8.05
Bessemer, Ala. T2 ..... 8.05
Bethlehem, Pa. B2 ..... 8.10
Clairton, Pa. U5 ..... 8.05
Fairfield, Ala. T2 ..... 8.05
Fontana, Calif. K1 ..... 8.85
Gary, Ind. U5 ..... 8.05
Geneva, Utah C11 ..... 8.05
Houston S5 ..... 8.15
Ind. Harbor, Ind. I-2 Y1/8.05
Johnstown, Pa. B2 ..... 8.10
KansasCity, Mo. S5 ..... 8.15
Lackawanna, N.Y. B2 ..... 8.10
LosAngeles B3 ..... 8.75
Munhall, Pa. U5 ..... 8.05
Phoenixville, Pa. P4 ..... 8.10
Seattle B3 ..... 8.80
S. Chicago, Ill. U5, W14 ..... 8.05
S. San Francisco B3 ..... 8.70
Sterling, Ill. N15 ..... 7.75
Struthers, O. Y1 ..... 8.05

H.S., L.A., Wide Flange
Bethlehem, Pa. B2 ..... 8.10
Ind. Harbor, Ind. I-2 ..... 8.05
Lackawanna, N.Y. B2 ..... 8.10
Munhall, Pa. U5 ..... 8.05
S. Chicago, Ill. U5 ..... 8.05
Sterling, Ill. N15 ..... 7.75

PILING

BEARING PILES
BethlehemPa. B2 ..... 5.55
Ind. Harbor, Ind. I-2 ..... 5.50
Lackawanna, N.Y. B2 ..... 5.55
Munhall, Pa. U5 ..... 5.50
S. Chicago, Ill. I-2, U5 ..... 5.50

STEEL SHEET PILING
Ind. Harbor, Ind. I-2 ..... 6.50
Lackawanna, N.Y. B2 ..... 6.50
Munhall, Pa. U5 ..... 6.50
S. Chicago, Ill. I-2, U5 ..... 6.50
Weirton, W.Va. W6 ..... 6.50

PLATES

PLATES, Carbon Steel
AlabamaCity, Ala. R2 ..... 5.30
Aliquippa, Pa. J5 ..... 5.30
Ashland, Ky. (15) A10 ..... 5.30
Atlanta A11 ..... 5.50
Bessemer, Ala. T2 ..... 5.30
Clairton, Pa. U5 ..... 5.30
Claymont, Del. P4 ..... 5.30
Cleveland J5, R2 ..... 5.30
Coatesville, Pa. L7 ..... 5.30
Conshohocken, Pa. A3 ..... 5.30
Ecorse, Mich. G5 ..... 5.30
Fairfield, Ala. T2 ..... 5.30
Farrell, Pa. S3 ..... 5.30
Fontana, Calif. (30) K1 ..... 6.10
Gary, Ind. U5 ..... 5.30
Geneva, Utah C11 ..... 5.30
GraniteCity, Ill. G4 ..... 5.40
Houston S5 ..... 5.40
Ind. Harbor, Ind. I-2, Y1 ..... 5.30
Johnstown, Pa. B2 ..... 5.30
Lackawanna, N.Y. B2 ..... 5.30
Mansfield, O. E6 ..... 5.30
Minnequa, Colo. C10 ..... 6.15
Munhall, Pa. U5 ..... 5.30
Newport, Ky. A2 ..... 5.30
Pittsburgh J5 ..... 5.30
Riverdale, Ill. A1 ..... 5.30
Seattle B3 ..... 6.20
Sharon, Pa. S3 ..... 5.30
S. Chicago, Ill. U5, W14 ..... 5.30
SparrowsPoint, Md. B2 ..... 5.30
Sterling, Ill. N15 ..... 5.30
Steubenville, O. W10 ..... 5.30
Warren, O. R2 ..... 5.30
Youngstown U5, Y1 ..... 5.30
Youngstown(27) R2 ..... 5.30

PLATES, Carbon Abras. Resist.
Claymont, Del. P4 ..... 7.05
Fontana, Calif. K1 ..... 7.85
Geneva, Utah C11 ..... 7.05
Houston S5 ..... 7.15
Johnstown, Pa. B2 ..... 7.05
SparrowsPoint, Md. B2 ..... 7.05

PLATES, Wrought Iron
Economy, Pa. B14 ..... 14.10

PLATES, H.S., L.A.
Aliquippa, Pa. J5 ..... 7.95
Ashland, Ky. A10 ..... 7.95
Bessemer, Ala. T2 ..... 7.95
Clairton, Pa. U5 ..... 7.95
Claymont, Del. P4 ..... 7.95
Cleveland J5, R2 ..... 7.95
Coatesville, Pa. L7 ..... 7.95
Conshocken, Pa. A3 ..... 7.95
Economy, Pa. B14 ..... 7.95
Ecorse, Mich. G5 ..... 7.95
Fairfield, Ala. T2 ..... 7.95
Farrell, Pa. S3 ..... 7.95
Fontana, Calif. (30) K1 ..... 8.75
Gary, Ind. U5 ..... 7.95
Geneva, Utah C11 ..... 7.95
Houston S5 ..... 8.05
Ind. Harbor, Ind. I-2, Y1 ..... 7.95
Johnstown, Pa. B2 ..... 7.95
Munhall, Pa. U5 ..... 7.95
Pittsburgh J5 ..... 7.95
Seattle B3 ..... 8.85
Sharon, Pa. S3 ..... 7.95
S. Chicago, Ill. U5, W14 ..... 7.95
SparrowsPoint, Md. B2 ..... 7.95
Sterling, Ill. N15 ..... 7.625
Warren, O. R2 ..... 7.95
Youngstown U5, Y1 ..... 7.95

PLATES, Alloy
Aliquippa, Pa. J5 ..... 7.50
Claymont, Del. P4 ..... 7.50
Coatesville, Pa. L7 ..... 7.50
Economy, Pa. B14 ..... 7.50
Farrell, Pa. S3 ..... 7.50
Fontana, Calif. K1 ..... 8.30
Gary, Ind. U5 ..... 7.50
Houston S5 ..... 7.60
Ind. Harbor, Ind. Y1 ..... 7.50
Johnstown, Pa. B2 ..... 7.50
Lowellville, O. S3 ..... 7.50
Munhall, Pa. U5 ..... 7.50
Newport, Ky. A2 ..... 7.50
Pittsburgh J5 ..... 7.50
Seattle B3 ..... 8.40
Sharon, Pa. S3 ..... 7.50
S. Chicago, Ill. U5, W14 ..... 7.50
SparrowsPoint, Md. B2 ..... 7.50
Youngstown Y1 ..... 7.50

FLOOR PLATES
Cleveland J5 ..... 6.375
Claymont, Del. P4 ..... 6.375
Conshohocken, Pa. A3 ..... 6.375
Ind. Harbor, Ind. I-2 ..... 6.375
Munhall, Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
S. Chicago, Ill. U5 ..... 6.375

PLATES, Ingot Iron
Ashland c.l. (15) A10 ..... 5.55
Ashland l.c.l. (15) A10 ..... 6.05
Cleveland c.l. R2 ..... 6.05
Warren, O. R2 ..... 6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala. City, Ala. (9) R2 ..... 5.675
Aliquippa, Pa. (9) J5 ..... 5.675
Alton, Ill. L1 ..... 5.675
Atlanta (9) A11 ..... 5.875
Bessemer, Ala. (9) T2 ..... 5.675
Birmingtom (9) C15 ..... 5.675
Buffalo (9) R2 ..... 5.675
Canton, O. (23) R2 ..... 6.15
Clairton, Pa. (9) U5 ..... 5.675
Cleveland (9) R2 ..... 5.675
Ecorse, Mich. (9) G5 ..... 5.675
Emeryville, Calif. J7 ..... 6.425
Fairfield, Ala. (9) T2 ..... 5.675
Fairless, Pa. (9) U5 ..... 5.825
Fontana, Calif. (9) K1 ..... 6.375
Gary, Ind. (9) U5 ..... 5.675
Houston (9) S5 ..... 5.925
Ind. Harbor (9) I-2, Y1 ..... 5.675
Johnstown, Pa. (9) B2 ..... 5.675
Joliet, Ill. P2 ..... 5.675
KansasCity, Mo. (9) S5 ..... 5.925
Lackawanna (9) B2 ..... 5.675
LosAngeles (9) B3 ..... 6.375
Massillon, O. (23) R2 ..... 6.15
Midland, Pa. (23) C18 ..... 6.025
Milton, Pa. M18 ..... 5.825
Minnequa, Colo. C10 ..... 6.125
Niles, Calif. P1 ..... 6.375
Owensboro, Ky. (9) G8 ..... 6.025
Pittsburg, Calif. (9) C11 ..... 6.375
Pittsburgh (9) J5 ..... 5.675
Portland, Oreg. O4 ..... 6.425
Riverdale, Ill. (9) A1 ..... 5.675
Seattle (9) A24, B3, N15 ..... 6.425
S. Ch'c'go (9) R2, U5, W14 ..... 5.675
S. Duquesne, Pa. (9) U5 ..... 5.675
S. San Fran., Calif. (9) B3 ..... 6.425
Sterling, Ill. (1) (9) N15 ..... 5.675
Sterling, Ill. (9) N15 ..... 5.775
Struthers, O. (9) Y1 ..... 5.675
Tonawanda, N.Y. B12 ..... 5.675
Torrance, Calif. (9) C11 ..... 6.375
Warren, O. C17 ..... 6.025
Youngstown (9) R2, U5 ..... 5.675

BARS, Hot-Rolled Alloy
Aliquippa, Pa. J5 ..... 6.725
Bethlehem, Pa. B2 ..... 6.725
Bridgeport, Conn. C32 ..... 6.80
Buffalo R2 ..... 6.725
Canton, O. R2, T7 ..... 6.725
Clairton, Pa. U5 ..... 6.725
Detroit S41 ..... 6.725
Economy, Pa. B14 ..... 6.725
Ecorse, Mich. G5 ..... 6.725
Farrell, Pa. S3 ..... 6.725
Fontana, Calif. K1 ..... 7.775
Gary, Ind. U5 ..... 6.725
Houston S5 ..... 6.975
Ind. Harbor, Ind. I-2, Y1 ..... 6.725
Johnstown, Pa. B2 ..... 6.725
KansasCity, Mo. S5 ..... 6.975
Lackawanna, N.Y. B2 ..... 6.725
LosAngeles B3 ..... 7.775
Lowellville, O. S3 ..... 6.725
Massillon, O. R2 ..... 6.725
Midland, Pa. C18 ..... 6.725
Owensboro, Ky. G8 ..... 6.725
Pittsburgh J5 ..... 6.725
Seattle(6) B3 ..... 7.825
Sharon, Pa. S3 ..... 6.725
S. Chicago R2, U5, W14 ..... 6.725
S. Duquesne, Pa. U5 ..... 6.725
Struthers, O. Y1 ..... 6.725
Warren, O. C17 ..... 6.725
Youngstown U5 ..... 6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa, Pa. J5 ..... 8.30
Bessemer, Ala. T2 ..... 8.30
Bethlehem, Pa. B2 ..... 8.30
Clairton, Pa. U5 ..... 8.30
Cleveland R2 ..... 8.30
Ecorse, Mich. G5 ..... 8.30
Fairfield, Ala. T2 ..... 8.30
Fontana, Calif. K1 ..... 9.00
Gary, Ind. U5 ..... 8.30
Houston S5 ..... 8.55
Ind. Harbor, Ind. Y1 ..... 8.30
Johnstown, Pa. B2 ..... 8.30
KansasCity, Mo. S5 ..... 8.55
Lackawanna, N.Y. B2 ..... 8.30
LosAngeles B3 ..... 9.00
Pittsburgh J5 ..... 8.30
Seattle B3 ..... 9.05
S. Chicago, Ill. R2, W14 ..... 8.30
S. Duquesne, Pa. U5 ..... 8.30
S. San Francisco B3 ..... 9.05
Sterling, Ill. N15 ..... 7.925
Struthers, O. Y1 ..... 8.30
Youngstown U5 ..... 8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem, Pa. (9) B2 ..... 5.885
Houston (9) S5 ..... 5.925
KansasCity, Mo. (9) S5 ..... 5.925
Lackawanna (9) B2 ..... 5.675
Sterling, Ill. N15 ..... 5.775
Sterling, Ill. (1) N15 ..... 5.675
Tonawanda, N.Y. B12 ..... 5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa, Pa. J5 ..... 5.675
Atlanta A11 ..... 5.875
Joliet, Ill. P22 ..... 5.675
Minnequa, Colo. C10 ..... 6.125
Niles, Calif. P1 ..... 6.375
Pittsburgh J5 ..... 5.675
Portland, Oreg. O4 ..... 6.425
SanFrancisco S7 ..... 6.52
Seattle B3 ..... 6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy, Pa. B14 ..... 16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa, Pa. J5 ..... 6.80
Clairton, Pa. U5 ..... 6.80
Gary, Ind. U5 ..... 6.80
Houston S5 ..... 7.05
KansasCity, Mo. S5 ..... 7.05
Pittsburgh J5 ..... 6.80
Youngstown U5 ..... 6.80

BARS, C.F. Leaded (Including leaded extra) Carbon
LosAngeles P2, S30 ..... 11.75*

Alloy
Ambridge, Pa. W18 ..... 10.175
BeaverFalls, Pa. M12 ..... 10.175
Camden, N.J. P13 ..... 10.35
Chicago W18 ..... 10.175
Elyria, O. W8 ..... 10.175
Monaca, Pa. S17 ..... 10.175
Newark, N.J. W18 ..... 10.35
SpringCity, Pa. K3 ..... 10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge, Pa. W18 ..... 7.65
BeaverFalls, Pa. M12, R2 ..... 7.65
Birmingham C15 ..... 8.25
Buffalo B5 ..... 7.70
Camden, N.J. P13 ..... 8.10
Carnegie, Pa. C12 ..... 7.65
Chicago W18 ..... 7.65
Cleveland A7, C20 ..... 7.65
Detroit B5, H5, P17 ..... 7.85
Detroit S41 ..... 7.65
Donora, Pa. A7 ..... 7.65
Elyria, O. W8 ..... 7.65
FranklinPark, Ill. N5 ..... 7.65
Gary, Ind. R2 ..... 7.65
GreenBay, Wis. F7 ..... 7.65
Hammond, Ind. J5, L2 ..... 7.65
Hartford, Conn. R2 ..... 8.15
Harvey, Ill. B5 ..... 7.65
LosAngeles(49) S30 ..... 9.10
LosAngeles(49) P2, R2 ..... 9.10
Mansfield, Mass. B5 ..... 8.20
Massillon, O. R2, R8 ..... 7.65
Midland, Pa. C18 ..... 7.65
Monaca, Pa. S17 ..... 7.65
Newark, N.J. W18 ..... 8.10
NewCastle, Pa. (17) B4 ..... 7.65
Pittsburgh J5 ..... 7.65
Plymouth, Mich. P5 ..... 7.90
Putnam, Conn. W18 ..... 8.20
Readville, Mass. C14 ..... 8.20
Seattle(49) S30 ..... 9.10
S. Chicago, Ill. W14 ..... 7.65
SpringCity, Pa. K3 ..... 8.10
Struthers, O. Y1 ..... 7.65
Warren, O. C17 ..... 7.65
Waukegan, Ill. A7 ..... 7.65
Willimantic, Conn. J5 ..... 8.15
Youngstown F3, Y1 ..... 7.65

BARS, Cold-Finished Alloy (Turned and Ground
Cumberland, Md. (5) C19 ..... 6.55

BARS, Cold-Finished Alloy
Ambridge, Pa. W18 ..... 9.025
BeaverFalls, Pa. M12, R2 ..... 9.025
Bethlehem, Pa. B2 ..... 9.025
Bridgeport, Conn. C32 ..... 9.175
Buffalo B5 ..... 9.025
Camden, N.J. P13 ..... 9.20
Canton, O. T7 ..... 9.025
Carnegie, Pa. C12 ..... 9.025
Chicago W18 ..... 9.025
Cleveland A7, C20 ..... 9.25
Detroit B5, P17 ..... 9.225
Detroit H5, S41 ..... 9.025
Donora, Pa. A7 ..... 9.025
Elyria, O. W8 ..... 9.025
FranklinPark, Ill. N5 ..... 9.025
Gary, Ind. R2 ..... 9.025
GreenBay, Wis. F7 ..... 9.025
Hammond, Ind. J5, L2 ..... 9.025
Hartford, Conn. R2 ..... 9.325
Harvey, Ill. R5 ..... 9.025
Lackawanna, N.Y. B3 ..... 9.025
LosAngeles P2, S30 ..... 11.00
Mansfield, Mass. B5 ..... 9.325
Massillon, O. R2, R8 ..... 9.025
Midland, Pa. C18 ..... 9.025
Monaca, Pa. S17 ..... 9.025
Newark, N.J. W18 ..... 9.20
Plymouth, Mich. P5 ..... 9.225
S. Chicago, Ill. W14 ..... 9.025
SpringCity, Pa. K3 ..... 9.20

Struthers,O. Y1 .....9.025
Warren,O C17 .....9.025
Waukegan, Ill. A7 .....9.025
Willimantic,Conn. J5 ...9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.00
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex.(26) T4 ..5.50
Gary,Ind. U5 .....5.675
Houston S5 .....5.675
Ind.Harbor,Ind. I-2, Y1.5.675
Johnstown,Pa. B2 .....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.675
Kokomo,Ind. C16 ....5.775
Lackawanna,N.Y. B2..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ...6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.675
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill. (1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ..6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.35
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5, ...7.35
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St. Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R) L5 ..19.80
McK.Rks.(Staybolt)L5 .20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4) (44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4)F5 ....5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 .....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 ....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ....7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 .....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.,City,Ala. R2	*7.125*	
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	*7.125*	
Fairfield,Ala. T2	7.125	7.475
Gary,Ind. U5	7.125	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.125	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ...7.475

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel

Follansbee,W.Va. W10 .7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325
Geneva,Utah C11 .....6.80

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

Sheets, Galvannealed Steel

Canton,O. R2 .....7.175
Irvin,Pa. U5 .....7.175

SHEETS, Galvanized Ingot Iron (Hot-Dipped Galvanized)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2. .6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ...7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,Wa.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calument Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N. Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H5 Hercules Drawn Steel
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply, Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 .....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1 ..5.10
Johnstown,Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2.5.10
LosAngeles(25) B3 .....5.85
LosAngeles C1 .....5.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 ....5.10
S.SanFrancisco(25) B3 ..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 .....8.40
KansasCity,Mo. S5 .....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 .....8.40
S.Chicago,Ill. W14 .....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 .....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1 7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3.8.325
SparrowsPoint,Md. B2 .7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
FranklinPark,Ill. T6 ..7.425
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10 .7.425
Fontana,Calif. K1 .....9.20
FranklinPark,Ill. T6 ..7.525
Ind.Harbor,Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ...7.525
NewBedford,Mass. R10.7.875
NewBritain,Conn. S15 .7.875
NewCastle,Pa. B4, M23.7.425
NewHaven,Conn. D2 ...7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3, N8.7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale,Ill. A1 .....7.425
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ...8.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ...7.975

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Cleveland A7 .....15.55
Carnegie,Pa. S18 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. S18 .....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. S8 ....15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ....10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80
Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55
Spring Steel (Tempered)			**Up to 0.80C**	**0.81-1.05C**	**1.06-1.35C**
Bristol,Conn. W1	...	...	18.85	22.95	27.80
Buffalo W12	...	...	18.85	....	....
Fostoria,O. S1	...	...	19.05	22.15	....
FranklinPark,Ill. T6	...	...	19.20	23.30	28.15
Harrison,N.J. C18	...	...	18.85	22.95	27.80
NewYork W3	...	...	18.85	22.95	27.80
Palmer,Mass. W12	...	...	18.85	....	....
Trenton,N.J. R5	...	...	18.85	22.95	27.80
Worcester,Mass. A7, T6	...	...	18.85	22.95	27.80
Youngstown S41	...	...	19.20	23.30	28.15

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ....7.525*
McKeesport,Pa. E10 ..7.50*
NewCastle,Pa. M23 ..7.425*
Riverdale,Ill. A1 ....7.525*
Warren,O. B9, S3, T5 .7.425*
Worcester,Mass. A7 ...7.975
Youngstown S41, Y1 .7.425*

Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.10	9.35	9.75
Fairless,Pa. U5	9.10	9.35	9.75
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.85
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	....	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	....	7.90	....	....
Niles,O. R2 (20-27 Ga.)	....	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Base Box			
	45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.10	$6.25	$6.40	$6.55
Fairless,Pa. U5	6.10	6.25	6.40	6.55
Gary,Ind. U5	6.10	6.25	6.40	6.55
IndianaHarbor,Ind. I-2	6.10	6.25	6.40	6.55
Irvin,Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint,Md. B2	6.10	6.25	6.40	6.55
Weirton,W.Va. W6	6.10	6.25	6.40	6.55

TIN PLATE,Hot Dipped 1.25 Common Coke	lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.40	10.65
Fairless,Pa. U5	10.40	10.65
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.20
Fairless,Pa. U5	8.20
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65
					Stator
Mansfield,O. E6					8.10
Vandergrift,Pa. U5					8.10
Warren,O. R2 (Locore)					8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 .....8.00
Crawfordsville,Ind. M8..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O.(24) S1 .....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ...8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 .....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16..8.00
Palmer,Mass. W12 .....8.30
Pittsburg,Calif. C11 ...8.95
Portsmouth,O. P12 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2...8.10
Sterling,Ill.(1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 .....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa.(10) B2 .12.65
KansasCity,Mo. U3 ...12.90
LosAngeles(2) B3 .....13.60
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ..12.95
Palmer,Mass. W12 ....13.70
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md.(10)B2 12.75
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
Kokomo,Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ..10.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ..10.075
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ...10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7 ...10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Milbury,Mass.(12) N6 .10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ...10.70
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ...10.70
SparrowsPt.,Md. B2 ...9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Wor'ster,Mass.A7,J4,T6 10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. M8.16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ..16.65
Johnstown,Pa. B2 ....16.30
KansasCity,Mo. S5 ....16.55
Kokomo,Ind. C16 .....16.30
Minnequa,Colo. C16 ....16.55
Monessen,Pa. P16 .....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 ....16.60
S.SanFrancisco C10 ...17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S41 .....13.45
Johnstown,Pa. B2 .....13.45
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer,Mass. W12 ....13.75
Portsmouth,O. P12 ....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 ...13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ...13.75
(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	....17.15
Monessen,Pa. P16	....17.15
Roebling,N.J. R5	....17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	.....12.35
Baltimore T6	.....12.65
Boston T6	.....12.65
Buffalo W12	.....12.35
Chicago W13	.....12.45
Cleveland A7	.....12.35
Crawfordsville,Ind. M8	.12.35
Dover,O. G6	.....12.35
Evanston,Ill. M22	.....12.45
Farrell,Pa. S3	.....12.35
Fostoria,O. S1	.....12.35
FranklinPark,Ill. T6	..12.45
Kokomo,Ind. C16	.....12.35
Massillon,O. R8	.....12.35
Milwaukee C23	.....12.55
Monessen,Pa. P7, P16	..12.35
NewCastle,Pa. M23	...12.35
Palmer,Mass. W12	....12.65
Pawtucket,R.I. N8	....12.65
Philadelphia P24	.....12.65
Riverdale,Ill. A1	.....12.45
Rome,N.Y. R6	.....12.35
Sharon,Pa. S3	.....12.35
Trenton,N.J. R5	.....12.65
Warren,O. B9	.....12.35
Worcester,Mass. A7, T6	.12.65

NAILS, Stock Sizes — **Col.**

AlabamaCity,Ala. R2	...173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	..175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	....$10.30

NAILS, CUT (100 lb kegs)

Wheeling,W.Va. W10	.$10.10

POLISHED STAPLES — **Col.**

AlabamaCity,Ala. R2	...175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	..177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIRE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	..$8.78
Atlanta A11	.....10.36
Bartonville,Ill. K4	.....8.88
Buffalo W12	.....10.26
Chicago W13	.....9.24
Crawfordsville,Ind. M8	..8.88
Donora,Pa. A7	.....8.78
Duluth A7	.....8.78
Fairfield,Ala. T2	.....8.78
Houston S5	.....10.51
Jacksonville,Fla. M8	....8.88
Johnstown,Pa. B2	.....8.78
Joliet,Ill. A7	.....8.78
KansasCity,Mo. S5	....10.51
Kokomo,Ind. C16	.....8.88
LosAngeles B3	.....9.20
Minnequa,Colo. C10	....9.02
Pittsburg,Calif. C11	....9.44
S.Chicago,Ill. R2	.....8.78
S.SanFrancisco C10	....9.94
SparrowsPt.,Md. B2	....8.88
Sterling,Ill.(37) N15	...8.88

Coil No. 6500 Stand. 100 lb. coil

AlabamaCity,Ala. R2	..$9.06
Atlanta A11	.....10.70
Bartonville,Ill. K4	.....9.16
Buffalo W12	.....10.60
Chicago W13	.....9.54
Crawfordsville,Ind. M8	..9.16
Donora,Pa. A7	.....9.06
Duluth A7	.....9.06
Fairfield,Ala. T2	.....9.06
Houston S5	.....10.85
Jacksonville,Fla. M8	...9.16
Johnstown,Pa. B2	.....9.06
Joliet,Ill. A7	.....9.06
KansasCity,Mo. S5	....10.85
Kokomo,Ind. C16	.....9.16
LosAngeles B3	.....9.50
Minnequa,Colo. C10	....9.30
Pittsburg,Calif. C11	....9.75
S.Chicago,Ill. R2	.....9.06
S.SanFrancisco C10	...10.26
SparrowsPt.,Md. B2	....9.16
Sterling,Ill.(37) N15	....9.16

Coil No. 6500 Interim 100 lb. coil

AlabamaCity,Ala. R2	..$9.11
Atlanta A11	.....10.75
Bartonville,Ill. K4	.....9.21
Buffalo W12	.....10.65
Chicago W13	.....9.59
Crawfordsville,Ind. M8	..9.21
Donora,Pa. A7	.....9.11
Duluth A7	.....9.11
Fairfield,Ala. T2	.....9.11
Houston S5	.....10.90
Jacksonville,Fla. M8	...9.21
Johnstown,Pa. B2	.....9.11
Joliet,Ill. A7	.....9.11
KansasCity,Mo. S5	....10.96
Kokomo,Ind. C16	.....9.21
LosAngeles B3	.....9.55
Minnequa,Colo. C10	....9.35
Pittsburg,Calif. C11	....9.80
S.Chicago,Ill. R2	.....9.11
S.SanFrancisco C10	...10.31
SparrowsPt.,Md. B2	....9.21
Sterling,Ill.(37) N15	....9.21

BALE TIES, Single Loop — **Col.**

AlabamaCity,Ala. R2	...212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	..214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS — **Col.**

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	..177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed — **Col.**

AlabamaCity,Ala. R2	..193**
Aliquippa,Pa. J5	.....190§
Atlanta A11	.....197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	..198
Donora,Pa. A7	.....193†
Duluth A7	.....193†
Fairfield,Ala. T2	.....193†
Houston S5	.....198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	.....196§
Joliet,Ill. A7	.....193†
KansasCity,Mo. S5	....198**
Kokomo,Ind. C16	.....195†
Minnequa,Colo. C10	..198**
Monessen,Pa. P7	.....196§
Pittsburg,Calif. C11	....213†
Rankin,Pa. A7	.....193†
S.Chicago,Ill. R2	.....193**
SparrowsPoint,Md. B2	..198§
Sterling,Ill.(7) N15	198

WIRE (16 gage) — **Stone** — **Stone**

Ala.City,Ala.R2	17.85 19.40**
Ali'ppa,Pa. J5	..17.85 19.65
Bartonville K4	..17.95 19.80
Chicago W13	....17.85 ....
Cleveland A7	....17.85 ....
Craw'sville M8	17.95 19.80‡‡
Fostoria,O. S1	..18.35 19.90†
Houston S5	....18.10 19.65**
Jacksonville M8	17.95 19.80‡‡
Johnstown B2	..17.85 19.65§
Kan.City,Mo. S5	.18.10 ....
Kokomo C16	....17.95 19.50†
Minnequa C10	..18.10 19.65**
P'lm'r,Mass.W12	18.15 19.70†
Pitts.,Calif. C11	.18.20 19.75†
S.SanFran. C10	18.20 19.75**
SparrowsPt. B2	..17.95 19.75§
St'ling(37) N15	..17.95 19.80
Waukegan A7	..17.85 19.40†
Worcester A7	....18.15 ....

WOVEN FENCE, 9-15 Ga. — **Col.**

Ala.City,Ala. R2	.....187**
Aliq'ppa,Pa.9-11½ga. J5	190§
Atlanta A11	.....191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	..192
Donora,Pa. A7	.....187†
Duluth A7	.....187†
Fairfield,Ala. T2	.....187†
Houston S5	.....192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	..190§
Joliet,Ill. A7	.....187†
KansasCity,Mo. S5	....192**
Kokomo,Ind. C16	.....189†
Minnequa,Colo. C10	...192**
Pittsburg,Calif. C11	...210†
Rankin,Pa. A1	.....187†
S.Chicago,Ill. R2	.....187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality (6 to 8 gage) — **An'ld Galv.**

Ala.City,Ala. R2	.9.00 9.55**
Aliquippa J5	....8.65 9.325§
Atlanta(48) A11	..9.00 9.75*
Bartonville(48) K4	9.85 19.90
Buffalo W12	.....9.00 9.55†
Chicago W13	....9.00 9.55**
Cleveland A7	.....9.00 ....
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	...9.00 9.55†
Duluth A7	.....9.00 9.55†
Fairfield T2	.....9.00 9.55†
Houston(48) S5	..9.25 9.80**
Jack'ville,Fla. M8	9.10 9.80‡‡
Johnstown(48) B2	9.00 9.675§
Joliet,Ill. A7	.....9.00 9.55†
KansasCity(48)S5	9.25 9.80**
Kokomo(48) S16	..9.10 9.65†
LosAngeles B3	..9.95 10.625§
Minnequa C10	...9.25 9.80**
Monessen(48) P7	.8.65 9.35§
Palmer,Mass. W12	.9.30 9.85†
Pitts.,Calif. C11	..9.95 10.50†
Rankin,Pa. A7	....9.00 9.55†
S.Chicago R2	.....9.00 9.55**
S.SanFran. C10	..9.95 10.50**
Spar'wsPt.(48)B2	9.10 9.775§
St'ling(37)(48)N15	.9.10 9.80
Struthers,O. Y1	...9.00 9.65‡
Worcester,Mass.A7	9.30 9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is to great.

Structural & in., larger 12.85

7/16 in. and smaller by 6 in. and shorter: 15% off list.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nuts 1⅛ in. through 1¼ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	39.25
Bulk	46

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	39.25
*Bulk	46

*Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use applicable list less bulk discounts.

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packaged	+55
Bulk	+16

Flat Head Cap Screws: ¾ in. and smaller, 6 in. and shorter:

Packaged	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:	
Packaged	+ 5
Bulk	19
Through 1 in. diam., longer than 6 in.:	
Packaged	+29

HEXAGON NUTS: American Standard: Finished hex, hex jam, and hex slotted coarse or fine fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	39.25
Bulk	46

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.00	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St.Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.28
2¼	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Toe Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	.....6.875
Gary,Ind. U5	.....6.875
Lackawanna,N.Y. B2	...6.875
Minnequa,Colo. C10	...6.875
Seattle B3	.....7.025
Steelton,Pa. B2	.....6.875
Torrance,Calif. C11	....7.025

JOINT BARS

Bessemer,Pa. U5	.....7.25
Fairfield,Ala. T2	.....7.25
Joliet,Ill. U5	.....7.25
Lackawanna,N.Y. B2	'..7.25
Minnequa,Colo. C10	....7.25
Steelton,Pa. B2	.....7.25

AXLES

Ind.Harbor,Ind. S13	...9.125
Johnstown,Pa. B2	.....9.125

SCREW SPIKES

Lebanon,Pa. B2	.....15.10

TRACK BOLTS, Untreated

Cleveland R2	.....15.35
KansasCity,Mo. S5	....15.35
Lebanon,Pa. B2	.....15.35
Minnequa,Colo. C10	...15.35
Pittsburgh S44	.....15.35
Seattle B3	.....15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	.....10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	....10.10
Lebanon,Pa. B2	.....10.10
Minnequa,Colo. C10	...10.10
Pittsburgh J5	.....10.10
Seattle B3	.....10.60
S.Chicago,Ill. R2	.....10.10
Struthers,O. Y1	.....10.10
Youngstown R2	.....10.10

FOOTNOTES

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.65c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2½ in. and smaller hexagons; 9.65c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 11.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	52.00
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	59.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	80.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates: Carbon Base 5%	10%	15%	20%	Sheets: Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.10	43.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y., R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
NevilleIsland, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	.. .	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....

Other U. S. Districts	Basic	No. 2 Foundry	Malle-able	Besse-mer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
PortColborne, Ont. A25	65.00	65.00	65.50	66.00
SaultSte. Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3, J1	78.00
PortColborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$99.00
NiagaraFalls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb orders (except stainless). Prices will vary with total weight of the order. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Los Angeles, and San Francisco, 10,000 lb. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS				STRIP	BARS				PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	STRUCTURAL SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	9.20	9.61	10.06	....	11.25	9.65	11.70	16.38	9.85	9.60	11.10
Birmingham	8.46	10.20	10.59	....	10.41	8.26	13.14	16.65	8.47	8.41	10.05
Boston	9.74	10.58	11.77	53.50	12.16	9.77	13.35	16.69	10.16	9.62	11.08
Buffalo	8.55	9.30	11.25	55.98	11.00	8.75	11.45	16.30	9.15	8.65	11.10
Charlotte, N. C.	10.52	11.22	10.55	....	11.51	10.32	12.68	....	10.53	10.47	12.11
Chicago	9.22	10.20	10.70	52.00	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	9.34	10.26	10.75	65.30	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	9.22	10.66	10.92	56.18	11.51	9.33	11.25	16.06	9.96	9.30	11.59
Dallas	10.57	10.05	11.75	....	12.13	9.98	12.98	16.95	10.21	9.81	11.18
Detroit	9.48	10.46	11.05	52.00	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	10.17	9.65	11.35	52.00	11.73	9.58	13.10	16.55	9.81	9.41	10.78
Indianapolis	9.66	10.64	11.14	....	11.83	9.66	11.09	16.39	10.01	9.50	11.79
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	10.35	11.20	12.10	61.27	12.40	10.25	14.20	17.35	10.45	10.30	12.30
Memphis Tenn.	9.63	10.35	10.80	....	11.29	9.48	12.70	16.53	9.67	9.32	11.18
Milwau e	9.36	10.34	10.84	....	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	9.62	10.60	11.10	....	11.79	9.62	11.05	16.40	9.97	9.46	11.75
Newark, N. J.	9.36	10.13	11.35	....	11.46	9.74	13.25	16.40	10.20	9.51	11.05
New York	9.36	10.13	11.35	52.98	11.46	9.74	13.25	16.40	10.20	9.51	11.00
Philadelphia	9.50	10.00	10.89	52.71	11.25	9.65	11.95	16.48	9.85	8.85	11.10
Pittsburgh	9.22	10.53	11.58	52.00	11.49	9.22	11.25	16.95	8.91	9.06	11.35
Portland, Oreg.	10.40	12.25	12.35	....	12.40	10.40	16.65	17.85	11.00	10.55	12.70
St. Louis	9.42	10.58	11.08	....	11.59	9.44	11.28	16.33	9.80	9.28	11.59
St. Paul	9.57	10.24	11.39	....	11.74	9.57	11.49	16.54	9.92	9.41	11.70
San Francisco	10.17	11.69	11.40	54.00	11.78	10.07	15.10	18.20	10.49	10.38	12.47
Seattle	11.35	12.45	13.40	54.02	12.80	10.80	10.20	17.80	11.59	10.95	13.60
Spokane, Wash.	11.20	12.30	13.25	54.02	12.65	10.65	16.20	17.85	11.35	10.80	13.01

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; stainless, 16 Ga. & 36 in.; hot rolled strip, ¼ in. x 1 in.; hot rolled carbon bars, rounds, ¾ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $146; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Vandalia, Mo., New Salisbury, Ohio, $97; Vanport, Pa., Wellsville, Irondale, Ohio, $100; Clearfield, Pa., Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $250; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Clearfield, Pa. $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore (periclase), $73; Pascagoula, Miss. (periclase), $90.

*—9 in. x 4½ x 2.50 straights.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Lump ½ in. and up	12.85
Fines, under ½ in.	10.72
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	25.00†
Chilean, 62-65%, c.i.f. Atlantic ports	22.00
Brazilian, 68.5% f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$16.00-16.50*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75
48% no ratio	24.00-26.00†

Turkish

48% 3:1	35.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.70-3.20
60-65%	3.25-3.45

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty, †Nominal.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:

Carbon (N.T.):	
Forging	$97.00
Rerolling	78.00
Alloy (N.T.)	115.00
Wire Rods:	
Carbon	5.70
Alloy	6.40
Wire (carload lots):	
Merchant annealed	8.40
Low carbon indus.	7.20
Upholstery spring	8.55
M.B. spring	8.85
Bars & Small Shapes:	
Carbon, merchant	5.30
Carbon, special	5.85
Alloy	6.40
Bar Mill Bands:	
Carbon	5.40
Alloy	8.05
Bars, Reinforcing	5.30

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, efective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60% $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. truckiots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron, Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe	36.75, ton del. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-760.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 39.80; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	36.50
Bronze powder, 90/10	54.20
Copper, all types	15.00*
Lead	7.50*
Manganese, minus 35 mesh	1.00
Nickel, all types	0.78-1.06
Nickel-Silver	57.90
Solder	7.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	23.20
Cobalt:	Dollars
98.5%, minus 100-300 mesh	1.57-1.58
99.5%, below 5 microns	2.32
Tungsten	nom.
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scrafing grades. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.84
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.80	$6.05	$5.75	$5.65	$5.95
Bar Size Angles	5.85	6.10	5.80	5.70	6.00
Structural Angles	5.75	6.00	5.70	5.60	5.90
I-Beams	5.70	5.95	5.65	5.55	5.85
Channels	5.70	5.95	5.65	5.55	5.85
Plates (basic bessemer)	5.45	5.80	5.50	5.40	5.70
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.20	24.70	24.40	24.40	25.20
Barbed Wire (†)	6.35	6.25	6.25	6.10	6.45
Merchant Bars	5.85	6.10	5.80	5.70	6.00
Hot-Rolled Bands	5.95	6.20	5.90	5.80	6.10
Wire Rods, Thomas Commercial No. 5	5.80	5.85	5.75	5.75	6.00
Wire Rods, O.H., No. 5	6.00	6.05	5.95	5.95	6.25
Bright Common Wire Nails (‡)	6.80	7.05	6.75	6.65	6.95

†Per 82 lb net reel. ‡Per 100-lb keg, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00

Cents per lb. f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per ton bulk, f.o.b. cars or trucks, plant.

Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa., 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn $98. For Neville Island, Pa., prices add $2.50. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Min 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 5% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 58-65%, C 5-7%, Si 4-6%, S 0.03% max., 20.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 58-65%, C 4.25% max., Si 1.0% max., S 0.03%, 21.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Low-Carbon Ferrochrome (Simplex) Cr 63-66% or 68-71%: C 0.025% max., 31.50c; C 0.010% max., 32.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Cr 68-73%: C 0.25% max., 33.00c. Cr 65-71%: C 0.05% max., 32.00c; C 0.10% max, 31.75c; C 0.20% max, 31.50c; C 0.50% max, 31.25c; C 1.0% max, 31.00c; C 1.5%, 30.75c; C 2.0% max, 30.50c, carlots, lump, bulk, delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%), C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). SM x D, carload, bulk, 20.05c per lb of alloy, carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max. 22.50c per lb contained Cr and 14.60c per lb contained Si; Cr. 33-36%, Si 45-48%, C 0.05% max, 22.50c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analysing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). $5.25 per lb (all quantities) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-77% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorous: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-75%). Per lb of contained Mo in 2000-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

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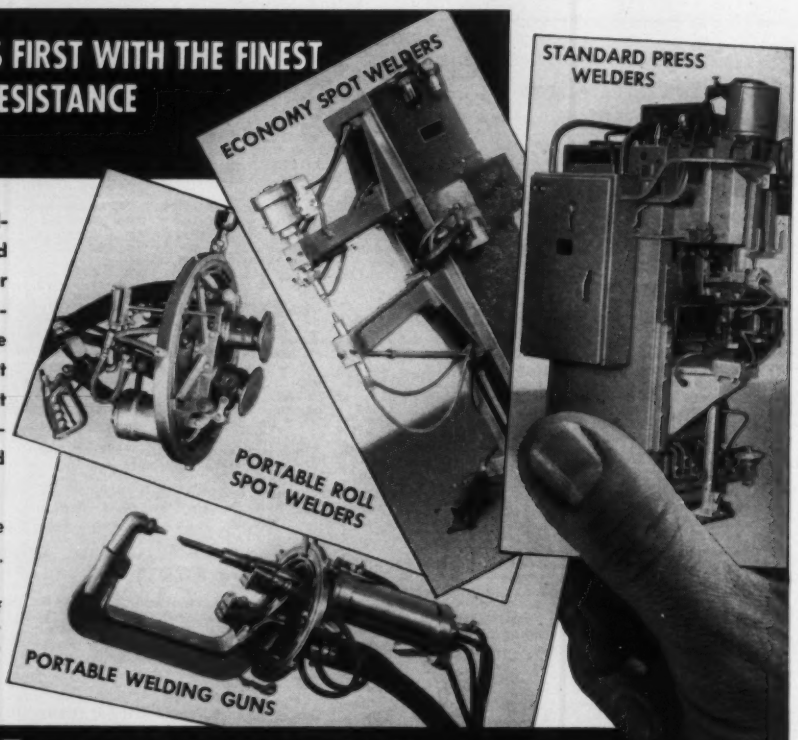
Shown here are a few examples of Progressive's many types of equipment for every welding requirement.



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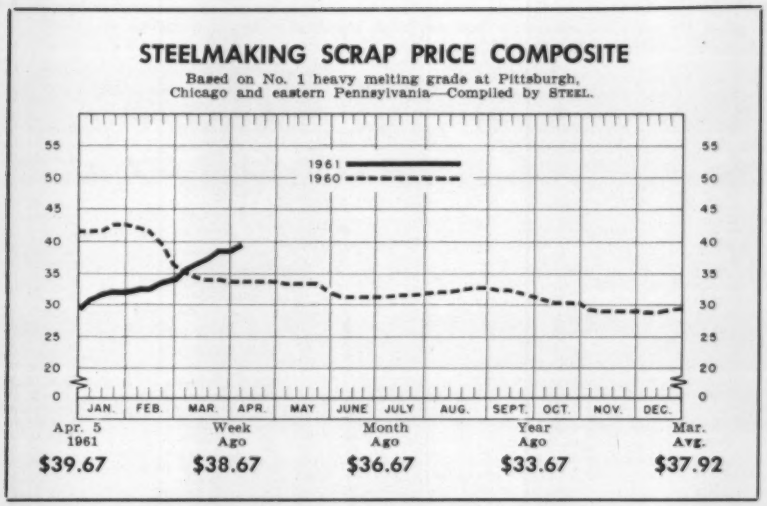


Scrap Price Uptrend Is Resumed

STEEL's composite on No. 1 heavy melting rises $1 a ton to $39.67 after holding unchanged for a week. Increase reflects bullishness attending rising steel rate

Scrap Prices, Page 146

● **Pittsburgh**—There's great activity here, but nobody seems to know whether the market is going up, down, or sidewise. First, No. 1 factory bundles went up $1.25 to $1.50 a ton (to $43.50, f.o.b., plant). Then No. 1 heavy melting scrap went up $2 a ton on a purchase by brokers for a mill on the edge of the district. But later bidding on B&O Railroad scrap suggested that the market was topping out; prices were the same as last month's.

Then brokers started lining up scrap for export on a special rate to Philadelphia—$8.56 a ton instead of $12.58, the normal rate for domestic shipments. To qualify, they must load 1000 gross tons (28 cars) in one day and ship them on one bill of lading. They're reportedly offering dealers $35 a ton for No. 1 heavy melting and $31 for No. 2 heavy melting, both f.o.b., Pittsburgh. The rate is effective for 90 days but may be renewable.

Some observers think export demand won't be strong enough to prevent the market from weakening. Local mills are showing no interest.

● **Chicago**—A few leading grades of steelmaking scrap are up 50 cents to $1 a ton on the basis of new market developments. One mill announced $41, delivered, as its April buying price for No. 1 industrial heavy melting it will acquire as returns from customers. That's $5 a ton more than it offered at the beginning of March, but it's only $1 over the current quotation.

● **Philadelphia**—While export demand for scrap has leveled off a bit, prices on the major steelmaking grades are unchanged with domestic buying picking up a little. Machine shop turnings are higher at $16, delivered. Low phos structurals and plates are now quoted $46-$48. No. 1 cupola is higher at $42, and so is malleable at $51.

● **New York**—Quickening foundry demand has boosted prices $2 a ton on the leading cast iron grades. Brokers are offering to buy No. 1 cupola at $36-$37, unstripped motor blocks at $25-$26, and heavy breakable cast at $31-$32. Prices on the steelmaking grades are unchanged.

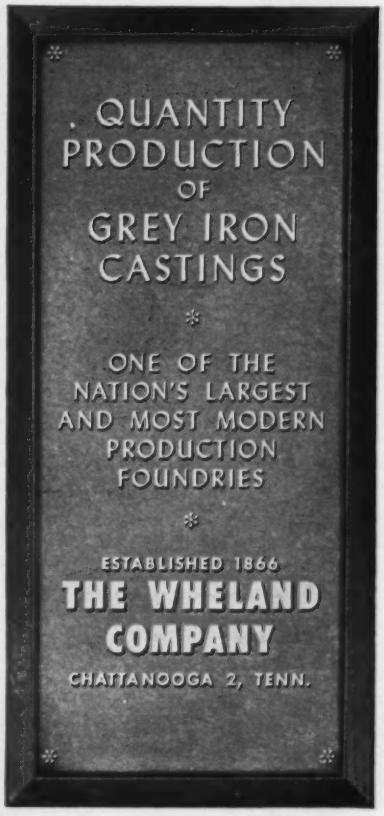
● **Cleveland**—Slowly rising steelmaking operations are encouraging scrapmen to hope for some substantial buying over coming weeks. However, dealers were disappointed last week when a major Valley steelmaker bought a tonnage of No. 1 heavy melting industrial scrap at $39, delivered, the same price that had been paid the preceding week. Dealers had been expecting a slight advance. Demand for the cast iron grades is improving with foundry operations up slightly.

● **Detroit**—Prices are steady as demand slows down following the buying on April auto lists. Dealers and brokers are optimistic, but say it's tough to make a sale right now.

● **Buffalo**—The primary steelmaking grades of scrap advanced $2 a ton as result of export demand and strength in other markets within shipping distance of area collected scrap. No. 1 heavy melting is up $2 to $31-$32, at which level No. 1 bundles and No. 1 busheling are also quoted. Secondary mill grades, including No. 2 bundles and No. 2 heavy melting, are up $1 a ton. The turnings grades are also up $1.

● **Cincinnati** — Two district mills are in the market for April delivery tonnage, paying $2 a ton higher than month ago prices. The rise was anticipated last week, when some traders marked up their quotations $1 a ton on the steelmaking grades. No. 1 heavy melting is now quoted by brokers at $32-$33.

(*Please turn to Page* 151)



Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Apr. 5, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Apr. 5	$39.67
Mar. 29	38.67
Mar. Avg.	37.92
Apr. 1960	33.67
Apr. 1956	54.90

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*36.00-37.00*
No. 2 heavy melting	*31.00-32.00*
No. 1 dealer bundles	*36.00-37.00*
No. 2 bundles	28.00-29.00
No. 1 busheling	*36.00-37.00*
No. 1 factory bundles	*45.00-46.00*
Machine shop turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Short turnings	20.00-21.00
Cast iron borings	19.00-20.00
Cut structurals:	
2 ft and under	40.00-41.00
3 ft and under	39.00-40.00
Heavy turnings	27.00-28.00
Punchings & plate scrap	42.00-43.00
Electric furnace bundles	43.00-44.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	37.00-38.00
Stove plate	37.00-38.00
Unstripped motor blocks	27.00-28.00
Clean auto cast	33.00-34.00
Drop broken machinery	45.00-46.00‡

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, 2 ft and under	52.00-53.00
Rails, 18 in. and under	53.00-54.00
Random rails	46.00-47.00
Angles, splice bars	43.00-44.00
Railroad specialties	46.00-47.00
Rails, rerolling	57.00-58.00

Stainless Steel Scrap

18-8 bundles & solids	180.00-185.00
18-8 turnings	105.00-110.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	*40.00-41.00*
No. 1 hvy melt., dealer	*38.00-39.00*
No. 2 hvy melting	32.00-33.00
No. 1 factory bundles	*43.50-44.50*
No. 1 dealer bundles	*39.00-40.00*
No. 2 bundles	25.00-26.00
No. 1 busheling, indus.	39.00-40.00
No. 1 busheling, dealer	37.00-38.00
Machine shop turnings	17.00-18.00
Mixed borings, turnings	19.00-20.00
Shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Cut structurals, 3 ft	42.00-43.00
Punchings & plate scrap	45.00-46.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Stove plate	39.00-40.00
Unstripped motor blocks	36.00-37.00
Clean auto cast	49.00-50.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	42.00-43.00
R.R. malleable	48.00-49.00
Rails, 2 ft and under	53.00-54.00
Rails, 18 in. and under	54.00-55.00
Angles, splice bars	45.00-46.00
Axles	61.00-62.00
Rails, rerolling	61.00-62.00

Stainless Steel Scrap

18-8 bundles, solids	*180.00-185.00*
18-8 turnings	*105.00-110.00*
430 bundles & solids	*95.00-100.00*
430 turnings	*50.00-55.00*

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	33.00-34.00
No. 2 bundles	21.00-22.00
No. 1 busheling	30.00-31.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00

Cast Iron Grades

No. 1 cupola	32.00-33.00
Stove plate	26.00-27.00
Heavy breakable	25.00-26.00
Unstripped motor blocks	*23.00-24.00*
Charging box cast	27.00-28.00
Clean auto cast	38.00-39.00

CLEVELAND

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	24.00-25.00
No. 1 factory bundles	40.00-41.00
No. 1 bundles	36.00-37.00
No. 2 bundles	23.00-24.00
No. 1 busheling	35.00-36.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	33.00-34.00
Cut structurals, plate, 2 ft and under	40.00-41.00
Low phos. punchings & plate	35.00-36.00
Alloy free, short shovel turnings	18.00-19.00
Electric furnace bundles	36.00-37.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Charging box cast	26.00-27.00
Heavy breakable cast	28.00-29.00
Stove plate	36.00-37.00
Unstripped motor blocks	31.00-32.00
Brake shoes	37.00-38.00
Clean auto cast	45.00-46.00
Burnt cast	32.00-33.00
Drop broken machinery	46.00-47.00

Railroad Scrap

R.R. malleable	45.00-46.00
Rails, 2 ft and under	52.00-53.00
Rails, 18 in. and under	52.00-53.00
Rails, random lengths	44.00-45.00
Cast steel	42.00-43.00
No. 1 railroad cast	48.00-49.00
Railroad specialties	47.50-48.50
Angles, splice bars	43.50-44.50
Rails, rerolling	56.00-57.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	155.00-160.00
18-8 turnings	70.00-75.00
430 clips, bundles, solids	70.00-75.00
430 turnings	15.00-25.00

YOUNGSTOWN

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	25.00-26.00
No. 1 busheling	39.00-40.00
No. 1 bundles	39.00-40.00
No. 2 bundles	25.00-26.00
Machine shop turnings	14.00-15.00
Shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Low phos.	39.00-40.00
Electric furnace bundles	40.00-41.00

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00

BUFFALO

No. 1 heavy melting	*31.00-32.00*
No. 2 heavy melting	*25.00-26.00*
No. 1 bundles	*31.00-32.00*
No. 2 bundles	*21.00-22.00*
No. 1 busheling	*31.00-32.00*
Shovel turnings	*17.00-18.00*
Machine shop turnings	*13.00-14.00*
Cast iron borings	*15.00-16.00*
Low phos. structurals and plates, 2 ft and under	39.00-40.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	38.00-39.00
No. 1 machinery	45.00-46.00

Railroad Scrap

Rails, random lengths	42.00-43.00
Rails, 3 ft and under	48.00-49.00
Rails, rerolling	58.50-59.50
Railroad specialties	41.00-42.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	28.50-29.50
No. 1 bundles	*33.00-34.00*
No. 2 bundles	*22.00-23.00*
No. 1 busheling	*32.00-33.00*
Machine shop turnings	11.00-12.00
Mixed borings, turnings	12.00-13.00
Shovel turnings	13.00-14.00
Cast iron borings	*12.00-13.00*
Low phos. 18 in.	39.00-40.00

Cast Iron Grades

No. 1 cupola	*37.00-38.00*
Heavy breakable cast	*29.00-30.00*
Charging box cast	35.00-36.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
Rails, 18 in. and under	46.00-47.00
Rails, random lengths	40.00-41.00

PHILADELPHIA

No. 1 heavy melting	43.00
No. 2 heavy melting	38.00
No. 1 bundles	44.00
No. 2 bundles	28.00
No. 1 busheling	44.00
Electric furnace bundles	45.00
Mixed borings, turnings	17.00
Shovel turnings	21.00
Machine shop turnings	*16.00*
Heavy turnings	*27.00†*
Structurals & plates	*46.00-48.00*
Couplers, springs, wheels	46.00
Rail crops, 2 ft & under	52.00-54.00

Cast Iron Grades

No. 1 cupola	*42.00*
Heavy breakable cast	41.00
Drop broken machinery	50.00-51.00
Malleable	*51.00*

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	30.00-31.00
No. 2 bundles	20.00-21.00
Machine shop turnings	5.50-6.00†
Mixed borings, turnings	6.00-6.50†
Shovel turnings	7.00-8.00†
Low phos. structural & plates	32.00-33.00

Cast Iron Grades

No. 1 cupola	*36.00-37.00*
Unstripped motor blocks	*25.00-26.00*
Heavy breakable	*31.00-32.00*

Stainless Steel

18-8 sheets, clips, solids	155.00-160.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	55.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.50-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 1 busheling	28.50-29.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	32.00-33.00
No. 2 bundles	23.00-24.00
No. 1 busheling	32.00-33.00
Cast iron borings	10.00-11.00
Machine shop turnings	19.00-20.00
Shovel turnings	21.00-22.00
Bar crops and plates	43.00-44.00
Structurals & plate	42.00-43.00
Electric furnace bundles	34.00-35.00
Electric furnace:	
3 ft and under	*36.00-37.00*
2 ft and under	*37.00-38.00*

Cast Iron Grades

No. 1 cupola	44.00-45.00
Stove plate	44.00-45.00
Unstripped motor block	32.00-33.00
No. 1 wheels	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt	33.00-34.00
Rails, 18 in. and under	47.00-48.00
Rails, random lengths	38.00-39.00
Angles, splice bars	43.00-44.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	35.00
No. 2 heavy melting	29.00
No. 1 bundles	35.00
No. 2 bundles	*25.00*
No. 1 busheling	*34.00*
Machine shop turnings	*13.00*
Shovel turnings	16.00

Cast Iron Grades

No. 1 cupola	*41.00*
Charging box cast	35.00
Heavy breakable cast	33.00
Unstripped motor blocks	35.00
Clean auto cast	41.00
Stove plate	*34.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*35.00*
Rails, random length	39.00†
Rails, rerolling	52.00-53.00
Rails, 18 in. and under	41.00-42.00
Angles, splice bars	40.00†

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	36.00
No. 1 bundles	37.00-38.00
No. 2 bundles	26.00-27.00
Machine shop turnings	*12.00-13.00*
Low phos. plate & structurals:	
3 ft	43.00
2 ft and under	*44.00-45.00*

Cast Iron Grades

No. 1 cupola	36.00-37.00
Heavy breakable	26.00-27.00
Foundry malleable	30.00-31.00
Unstripped motor blocks	31.00-32.00

Railroad Scrap

R.R. heavy melt (3 ft)	43.00

LOS ANGELES

No. 1 heavy melting	40.00
No. 1 hvy melt (export)	40.00-43.00
No. 2 heavy melting	38.00
No. 2 hvy melt (export)	40.00
No. 1 bundles	*39.00*
No. 2 bundles	24.00-27.00
No. 2 bundles (export)	29.00
Machine shop turnings	*18.00*
Shovel turnings	*20.00*
Cast iron borings	*18.00*
Cut structurals and plate 1 ft and under	*48.00*

Cast Iron Grades

No. 1 cupola	*48.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*41.00*

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	*44.00-45.00*
No. 2 heavy melting	*41.00*
No. 2 bundles	*34.00*
Shovel turnings	*16.00-18.00*
Electric furnace bundles	*52.00*

Cast Iron Grades

No. 1 cupola	*40.00-42.00*
Heavy breakable	*36.00-37.00*
Unstripped motor blocks	*37.00*
Stove plate (f.o.b. plant)	*37.00*

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	*44.00*
No. 1 hvy (unprepared)	*41.00*
No. 2 heavy melting	*41.00*
No. 2 hvy (unprepared)	*38.00*
No. 2 bundles	*34.00*
Shovel turnings	*16.00*
Electric furnace bundles	*50.00*

Cast Iron Grades

No. 1 cupola	42.00
Heavy breakable cast	39.00
Unstripped motor blocks	*37.00*
Stove plate (f.o.b. plant)	*37.00*

SAN FRANCISCO

No. 1 heavy melting	*42.00***
No. 2 heavy melting	*39.00***
No. 1 bundles	34.00**
No. 2 bundles	*27.00***
Machine shop turnings	20.00**
Mixed borings, turnings	20.00**
Cast iron borings	20.00**
Heavy turnings	20.00**
Shovel turnings	20.00**
Cut structurals, 3 ft	*44.00*

Cast Iron Grades

No. 1 cupola	46.00-47.00
Charging box cast	34.00
Stove plates	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

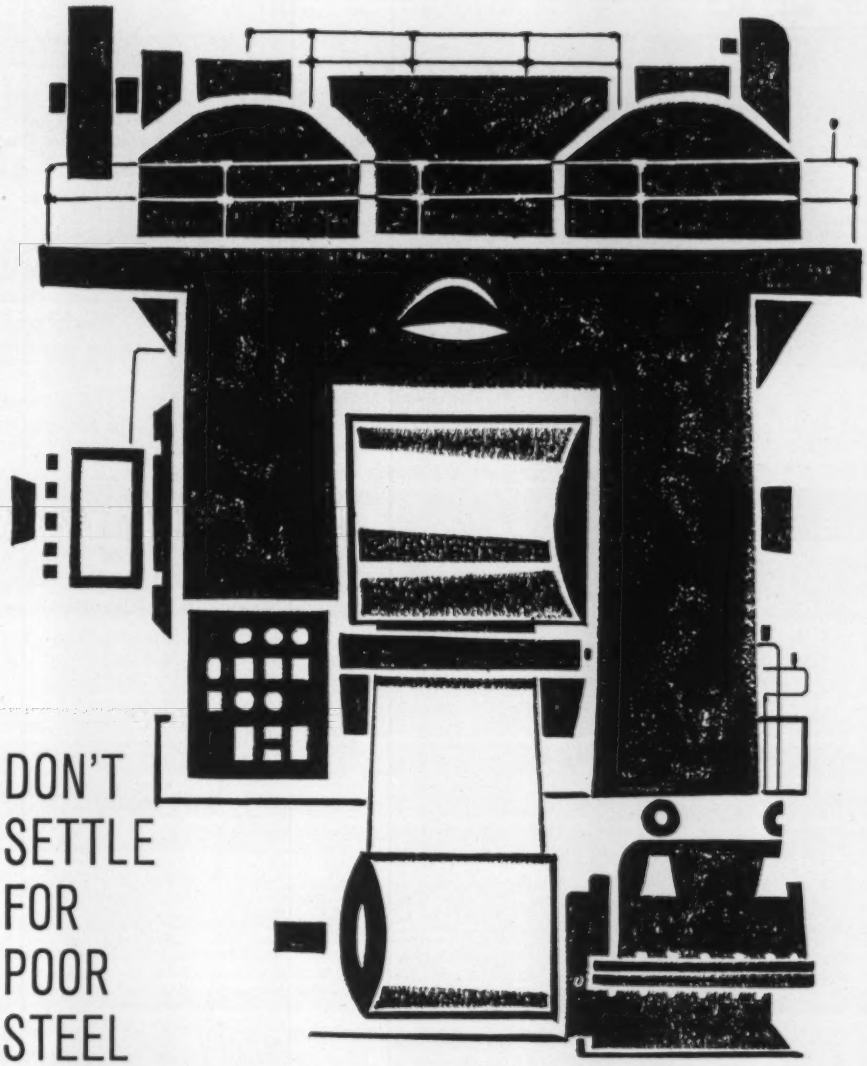
(Brokers' buying prices; net tons)

No. 1 heavy melting	28.00
No. 2 hvy melt, 2 ft & under	27.00
No. 1 bundles	28.00
No. 2 bundles	17.50
Mixed steel scrap	20.00
Mixed borings, turnings	12.00
Busheling, new factory: Prepared	28.00
Uuprepared	22.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	32.00

*For export add $4 dock charge.
**Based mainly on export sales.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.



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Aluminum People Set Fast Market Pace

Nonferrous Metal Prices, Pages 150 & 151

ALTHOUGH the aluminum industry has been bounced around by the recession, particularly in the profit column, it is not easing up its marketing efforts. Nowhere is this more evident than in the highly competitive building field where the Big Three (Alcoa, Reynolds, Kaiser) have been ardently wooing the contractor, architect, and home owner.

The campaign has taken producers into such far removed areas as urban renewal.

For example, Reynolds Metals Co. has urban renewal projects in six major cities (Cincinnati, Philadelphia, Washington, Richmond, Kansas City, Kans., Kansas City, Mo.), reveals Albert M. Cole, former administrator of the government's Housing & Home Finance Agency. (He now heads up Reynolds Aluminum Service Corp.)

The Eastwick Project in Philadelphia is the largest one. Reynolds' phase includes about 5000 residential units, plus commercial and industrial buildings, says Mr. Cole.

In Richmond, Reynolds is working on what is said to be the first residential development in this country to use the condominium principle of ownership. The setup, long popular in parts of Europe, differs from an ordinary co-op in that the owner gets a clear title to his dwelling. Under the ordinary co-op arrangement, the dweller owns stock in a corporation and can lose his right to possession if the corporation fails.

Reynolds believes urban redevelopment offers four major opportunities: 1. An expansion of the corporate image. 2. A practical implementation of product development. (It provides a climate to develop new concepts of design and construction and to test them under controlled conditions.) 3. A market for aluminum products. 4. The projects themselves will develop a reasonable profit.

Look for such producer-to-consumer programs to grow. Other prime producers of building materials are becoming interested in this concept.

• **More Hot Metal**—Another major aluminum effort, the drive to capture as much automotive business as possible, is also running well. Kaiser Aluminum & Chemical Corp. has just signed a contract with General Motors Corp. that could signal its entry into the "hot metal" field.

Here's the story: For some time, GM has been buying "cold" metal from Kaiser's Ravenswood, W. Va., plant for its foundry at Defiance, Ohio. Several weeks ago, West Virginia repealed laws that prohibited the transport of molten metal over state highways. Immediately, GM began to make test runs, hauling the molten metal 285 miles between Ravenswood and Defiance (over twice as far as molten metal has been transported heretofore).

A lot of problems have to be worked out, but under the new contract GM will take significant tonnages from Ravenswood, be it "hot" or "cold." If shipment of the "hot metal" proves practical, it will signal Kaiser's entry into this field. Both Alcoa and Reynolds have been in this business for some time.

Also look for stepped up efforts to promote aluminum wheels and bumpers. They would consume more of the light metal than the aluminum engine.

Antimony Hiked

A jump in the price of ores brought a sharp hike in antimony prices last week. The price of Lone Star brand, 99.5 per cent, f.o.b. Laredo, Tex., (in bulk) is now $33, up $3.50. The price of the R.M.M. brand rose a like amount to $32.50. Foreign brands are up $2. It marks the first movement in domestic prices since February, 1958.

Behind the rise is continued strength in demand from users of the metal and an upsurge in demand for antimony oxides.

Missile on Rails

Aluminum is the choice for the roof of the first missile-launching railroad car that will house the Minuteman ICBM. Design, development, and production of these mobile launching platforms are being handled jointly by American Machine & Foundry Co. and ACF Industries Inc. for Boeing Airplane Co. (the weapon system integrator). Aluminum sheets, plates, structurals, and extrusions for roofs of the prototype cars are supplied by Aluminum Co. of America.

NONFERROUS PRICE RECORD

	Apr. 5 Price	Last Change	Previous Price	Mar. Avg	Feb. Avg	Apr., 1960 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	26.000	26.000	33.000
Copper	29.00	Jan. 17, 1961	29.00–30.00	29.000	29.000	33.296
Lead	10.80	Dec. 13, 1960	11.80	10.800	10.800	11.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	104.50	Apr. 4, 1961	104.625	103.485	101.181	99.260
Zinc	11.50	Jan. 9, 1961	12.000	11.500	11.500	13.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, East St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingot, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig, 99.8%, Velasco, Tex.

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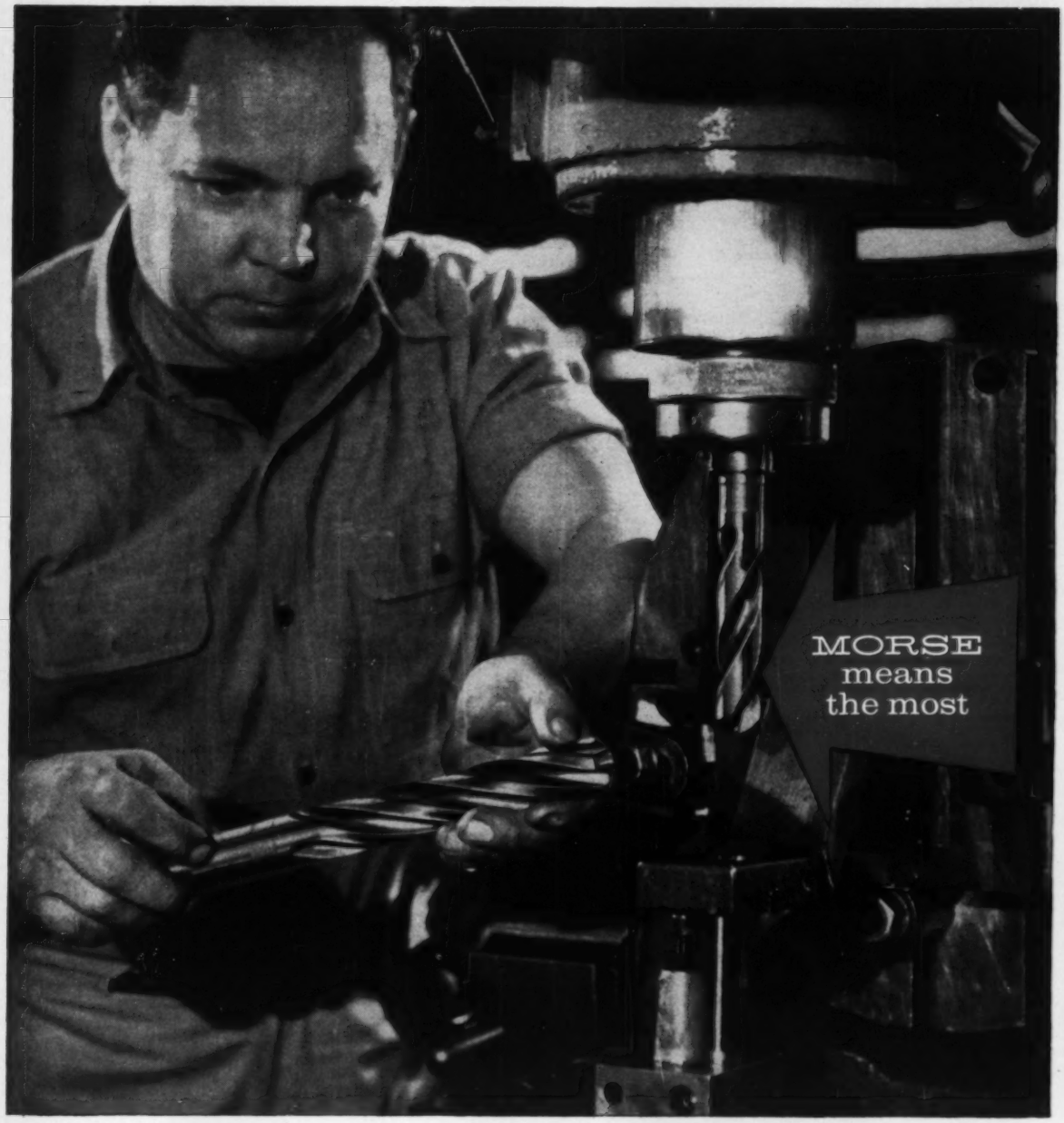

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2093

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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 29.00; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 99.5%, 32.50; Lone Star brand, 33.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 30.50-31.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55 per lb and up nom.

Copper: Electrolytic, 29.00 deld.; custom smelters, 29.00; lake, 29.00 deld.; fire refined, 28.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld.; 24-90 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $206-208 per 76 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel 69.60.

Osmium: $70-90 per troy oz. nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.50-5 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 104.50.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.10-4.00.

Zinc: Prime western, 11.50; brass special, 11.75; intermediate, 12.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.85; special high grade, 13.00 deld. Die casting alloy ingot No. 3, 14.25; No. 2, 14.75; No. 5, 14.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8-8.50 per lb; 100-500 lb, $7.25-7.50 per lb; 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.00; No. 12 foundry alloy (No. 2 grade), 21.75; 5% silicon alloy, 0.60 Cu max., 23.00; 13 alloy, 0.60 Cu max., 23.50; 195 alloy, 24.75; 108 alloy, 22.25. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.50; grade 3, 21.50; grade 4, 21.00.

Brass Ingot: Red brass, No. 115, 29.25; tin bronze, No. 225, 38.75; No. 245, 33.25; high leaded tin bronze, No. 305, 33.50; No. 1 yellow, No. 405, 28.75; manganese bronze, No. 421, 28.00.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.935, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.935, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 34.355; l.c.l., 34.98. Weatherproof, 20,000-lb lots, 35.55; l.c.l., 36.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-114	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; length, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths.

Diam	Round		Hexagonal	
(in.)*	2011-T3	2017-T4	2011-T3	2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	..	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.60
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grades (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 22.00-22.50; No. 2 heavy copper and wire, 20.75-21.25; light copper, 18.25-18.75; No. 1 composition red brass, 19.25-19.75; No. 1

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 29.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.13b	51.36c	....	55.32	25.000	25.000	24.250
Yellow Brass	48.10	33.71d	48.39	52.26	19.250	18.375	17.375
Low Brass, 80%	50.65	50.39	50.94	54.71	21.375	21.125	20.625
Red Brass, 85%	51.54	51.48	51.83	55.60	22.250	22.000	21.500
Com. Bronze, 90%	52.98	52.92	53.27	56.79	23.000	22.750	22.250
Manganese Bronze	56.56-56.59	50.22-50.24	60.47	....	18.000	17.750	17.250
Muntz Metal	50.94	46.25	....	....	18.125	17.875	17.375
Naval Brass	52.86	46.67	59.17	57.02	18.000	17.750	17.250
Silicon Bronze	59.49	58.68	58.78	77.90	24.500	24.250	23.500
Nickel Silver, 10%	63.66	65.99	65.74	....	24.125	23.875	12.062
Phos. Bronze, A-5%	74.59	75.09	74.34	76.52	26.125	25.875	24.875

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 18.25-18.75; new brass clippings, 16.25-16.75; light brass, 13.25-13.75; heavy yellow brass, 14.25-14.75; new brass rod ends, 15.25-15.75; auto radiators, unsweated, 14.50-15.00; cocks and faucets, 16.00-16.50; brass pipe, 16.50-17.00.

Lead: Soft scrap lead, 7.00-7.50; battery plates, 2.75; linotype and stereotype, 8.00-8.25; electrotype, 7.50-7.75; mixed babbitt, 9.50-10.00.

Monel: Clippings, 23.00-23.50; old sheets, 22.00-23.00; turnings, 16.50-17.00; rods, 22.00-23.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 2.75-3.00; new diecast scrap, 2.75-3.00; old diecast scrap, 1.00-1.25.

Aluminum: Old castings and sheets, 9.00-9.50; clean borings and turnings, 4.50-5.00; segregated low copper clips, 11.00-11.50; segregated high copper clips, 10.00-10.50; mixed low copper clips, 10.50-11.00; mixed high copper clips, 10.00-10.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 10.00-10.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 13.00-13.50; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.50-11.00; clean borings and turnings, 8.50-9.00; segregated low copper clips, 14.00; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 55.00; light scrap, 50.00; turnings and borings, 35.00.

Copper and Brass: No. 1 heavy copper and wire, 25.50; No. 2 heavy copper and wire, 23.75; light copper, 21.50; refinery brass (60% copper) dry copper content, 22.25.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 25.50; No. 2 heavy copper and wire, 23.75; light copper, 21.75; No. 1 composition borings, 21.50; No. 1 composition solids, 22.00; heavy yellow brass solids, 16.50-17.50; yellow brass turnings, 15.00; radiators, 17.50.

Plating Material

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.
Copper: Flat-rolled, 46.04; oval, 42.50; electrodeposited, 38.00; cast, 40.50; 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 123.50; 200-499 lb, 122.00; 500-999 lb, 121.50; 1000 lb or more, 121.00.

Zinc: Balls, 18.75; flat tops, 18.75; flats 21.50; ovals, 20.75, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.00; 2000-5900 lb, 13.00; 6000-11,900 lb, 12.75; 12,000-22,900 lb, 12.50; 23,000 lb or more, 12.00.

Nickel-Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 500-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 2000 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 81.20; 100-600 lb, 71.70; 700-1900 lb, 69.00; 2000-9900 lb, 67.10; 10,000 lb or more, 65.80.

Stannous Chloride (Anhydrous): 25 lb, 156.80; 100 lb, 152.00; 400 lb, 149.50; 800-19,900 lb, 108.70; 20,000 lb or more, 102.60.

Stannous Sulphate: Less than 50 lb, 141.90; 50 lb, 111.30; 100-1900 lb, 109.30; 2000 lb or more, 107.30.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 145*)

Scrap is moving freely at current price levels.

• **St. Louis**—The market has leveled off, and a little weakness appears to be developing. The mills are more selective in buying, in general bucking the quoted prices with more careful ordering. As a result, demand has eased off in five categories: No. 2 bundles, No. 1 busheling, machine shop turnings, stove plate, and No. 1 railroad heavy melting. Each is quoted off $1 a ton.

• **Houston**—The East Texas plant of Lone Star Steel Co. has recalled 600 of the 1800 employees it furloughed at the start of the year. Stepped-up operations are expected to give the area scrap market a lift. Recently hiked prices have improved the flow of material to dealers' yards.

• **Birmingham**—Strong export demand is bolstering the district market. Brokers' nominal quotations on electric furnace scrap are: Electric furnace bundles, 3 ft and under, $36-$37; 2 ft and under, $37-$38. A district mill is expected to enter the market shortly for substantial tonnage. The cast iron grades appear weak.

• **Los Angeles**—Export buying is bolstering local scrap prices. Domestic mill demand is expected to remain dormant until next month. Foundry requirements are expanding, however.

• **San Francisco**—Prices have advanced $2 a ton on several grades, based almost entirely on strong export demand. No. 1 heavy melting is now quoted at $42, No. 2 heavy melting at $39, No. 2 bundles at $27, and cut structurals at $44.

• **Portland, Oreg.**—Prices are up $3 a ton in this market. Improved mill buying and active export demand have given the situation a more promising look. Two full cargoes in April and two in May are scheduled to leave for Japan, which continues to buy in volume. Better weather and higher prices are stimulating collections.

• **Seattle**—Local scrap prices are up $2 to $3 a ton. The new levels are expected to hold through April. No. 1 heavy melting is now quoted at $44, No. 2 at $41, and No. 2 bundles at $34. Exporters are accumulating tonnage for shipment to Japan, and domestic buying is increasing.

Structural Shapes . . .

Structural Shape Prices, Page 136

Inquiry for fabricated structurals is more active, but competition continues keen, and many of the smaller fabricating shops can give deliveries within eight weeks. The medium and large size fabricators, in general, promise shipments in three to four months.

Plain structural shapes are available for delivery from mills within two to three weeks. On the average, shipments are a trifle more extended than they were a month ago.

The awarding of 3000 tons of structurals for an office building in Portland, Oreg., is expected shortly. Bids are being called Apr. 14 on two Oregon highway projects involving 3700 tons of structurals.

CLASSIFIED

WANTED

Blast Cleaning Room, Air or Airless. Must be large size.

Reply Box 921, STEEL
Penton Bldg., Cleveland 13, Ohio

Accounts Wanted

OHIO REPRESENTATION

Well established Manufacturers' Agent, graduate engineer, interested in representing one additional account in the State of Ohio. Must be well rated firm making a product that requires engineering knowledge to do a good sales job. Reply Box 922, STEEL, Penton Bldg., Cleveland 13, Ohio.

Help Wanted

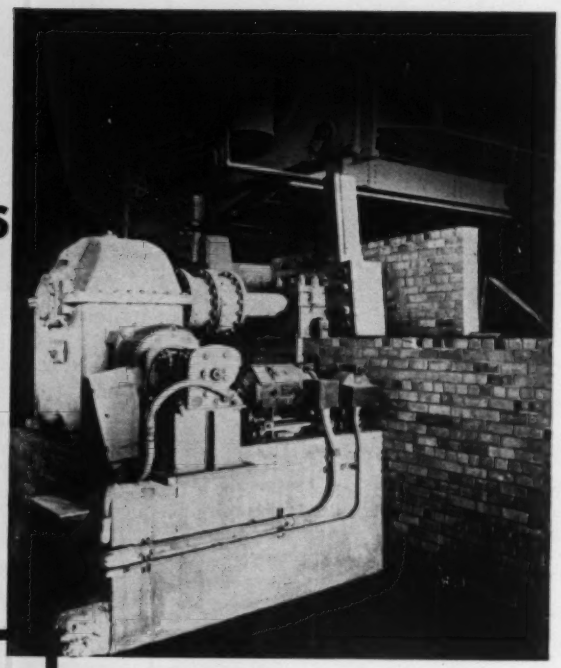
MELTING FOREMAN—MELTER

Melting Foreman—Electric arc Furnaces—Carbon and alloy Steels. Plant capacity 1800 tons per month. Location Milwaukee, Wisconsin. In reply please include complete resume to: Box 923, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED RATES

All classifications other than "Position Wanted" set solid, 50 words or less $20.00, each additional word, .40; all capitals, 50 words or less $23.00, each additional word .50; all capitals leaded, 50 words or less $28.00, each additional word .65. "Position Wanted" set solid, 25 words or less $5.50, each additional word .22; all capitals 25 words or less $7.50, each additional word .29; all capitals leaded 25 words or less $9.00, each additional word .35. Keyed address takes seven words. Cash with order necessary on "Position Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

Tilting 700-tons of steel furnace



CONE-DRIVE GEARS

DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

Here's a closeup of tilting mechanism for an electric furnace. Standard, stock model, double-reduction Cone-Drive **double-enveloping worm** gear speed reducer tilts furnace and heat with combined weight of 700 tons.

Powerful Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

We bet millions on our couplings

When you buy a Fast's coupling, you can bet your bottom dollar everything was built on the spot, not assembled piece by piece from other suppliers. Koppers multi-million dollar manufacturing facilities are the most modern in the industry . . . with advanced program machines, highly accurate gear shapers, a complete forge shop.

For example, all Fast's Couplings are jig-drilled and jig-reamed for greater interchangeability of parts. Result: you get high-quality, smooth-running, long-lived units that are the choice of more equipment manufacturers than any other gear-type coupling.

KOPPERS COMPANY, INC., 304 Scott Street, Baltimore 3, Md.

KOPPERS

FAST'S COUPLINGS

Engineered Products Sold with Service

Bids will be taken Apr. 18 on the second Lake Washington floating bridge, Seattle, involving 1300 tons of shapes.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

350 tons, Perimeter Building, Seattle Century 21 Exposition, to Standard Steel Fabricating Co. Inc., Seattle; Dahlgren Construction Co., Seattle, general contractor.

310 tons, Benjamin Franklin School, Harrisburg, Pa., through Lambert & Intreri, general contractor, to Goetz Welding Co., Harrisburg.

195 tons, two parallel grade separations, interchange FAI 74 and 80 West of Geneseo, Henry County, Ill., to American Bridge Div., U. S. Steel Corp., Pittsburgh.

100 tons or more, hydraulic turbines, units 7 and 8, Bull Shoals powerhouse, U. S. Engineer, Little Rock, Ark., to Newport News Shipbuilding & Drydock Co., Newport News, Va.

100 tons or more, hydraulic turbines, Dardanelle lock and dam powerplant, Arkansas River, Arkansas, to Willamette Iron & Steel Co., Portland, Oreg.

Unstated tonnage, heavy duty galvanized steel scaffolding, Portsmouth (N. H.) Navy yard, to the Patent Scaffolding Co. of Mass., Boston.

STRUCTURAL STEEL PENDING

2242 tons, two seven-span, welded, composite, plate girder bridge, South Burlington, Vt.; bids Apr. 28, Montpelier, Vt.; also, 737 tons of concrete reinforcing bars and 4810 linear feet of steel piling.

2000 tons, parochial high school, Brooklyn, N. Y.; bids Apr. 7.

2000 tons, Bishop Reilly High School, New York; bids Apr. 23.

1000 tons, steam electric station, Ebasco, Sioux City, Iowa; bids Apr. 10.

870 tons, 26 towers, Public Service Electric & Gas Co., Metuchen, N. J.; bids closed Apr. 4.

725 tons, state bridgework, FASH 61-9-FARC 61-32, Ulster County, New York; John Arborio low on general contract.

700 tons, state highway bridge, FISH 61-8, Essex and Clinton Counties, New York; Torrington Construction Co. low on general contract.

600 tons, building No. 22, Allentown, Pa., Western Electric Co.

600 tons, motel unit "C," 42nd Street, New York; Euclid Contracting Corp. low on general contract.

592 tons, two state bridges, Yarmouth, Maine; Frank Rossie & Son Inc., Gardiner, Maine, general contractor; also, 165 tons of concrete reinforcing bars, and 425 tons of steel piling.

560 tons, senior high school, Paoli, Pa.; Fleming Co., Philadelphia, is low on the general contract.

PLATES . . .

PLATES PLACED

1896 tons, four contracts, hull plates, Military Industrial Supply Agency, Navy, Philadelphia, to Caine Steel Co., Philadelphia.

1000 tons or more, Unit 3, 10 miles, pile supported 87 in. ID, third Makelumme Aqueduct, San Joaquin and Contra Costa Counties, Oakland, Calif., to U. S. Steel Corp., Pittsburgh.

568 tons, hull plates, Military Industrial Supply Agency, Navy, Philadelphia, to C. Itoh & Co. (American) Inc., New York.

226 tons, hull, Military Industrial Supply Agency, Navy, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

196 tons, two contracts, Military Industrial Supply Agency, Navy, Philadelphia, to Lukens Steel Co., Coatesville, Pa.

175 tons, 30 in. pipe, Sun Oil Co., Philadelphia, to Claymont (Del.) plant of Phoenix Steel Corp.

128 tons, three contracts, Military Industrial Supply Agency, Navy, Philadelphia, to U. S. Steel Corp., Pittsburgh.

100 tons, jet fuel storage, Robins AFB, Georgia, to Chicago Bridge & Iron Co., Chicago.

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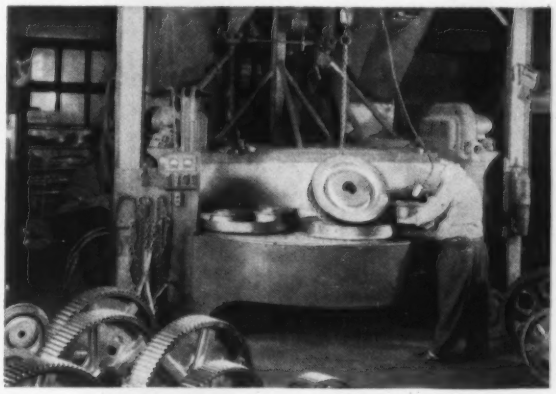

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